SUBJECT INDEX.

References to the papers read before the Institute are indicated by the word *Paper* following the page number. The letter *P.* denotes a reference in Section 1 of the Journal which contains the reports of the proceedings of meetings, the papers read, and the discussions thereon. The letter *A.* denotes a reference to the section dealing with abstracts.

Indexing of Alloy Steels and Other Alloys. In the indexing of alloy steels, carbon and iron are ignored and the alloying elements contained in the steel are arranged in alphabetical order; for example, all references to nickel-chromium-molybdenum steel will be found under the heading chromium-molybdenum-nickel steel. In the indexing of other alloys, carbon and iron when present, are included in the title; iron, when present, is always mentioned first and the other elements follow in alphabetical order, carbon being in all cases mentioned last. Examples: " iron-silicon-carbon alloys " and " iron-chromium-nickel-carbon alloys."

ABLETT PRIZE, awarded to H. Escher, 16*P.*

ABRASIVE WHEELS, wire, use in electroplating industry, 33*A.*

ABRASIVES, metallic, 39*A.*, 168*A.*

ACCIDENTS, in foundries, 272*A.*, 341*A.*

ACID BESSEMER PROCESS, 342*A.*

ACID ELECTRIC STEEL, compared with basic electric steel, 90*A.*

ACID OPEN-HEARTH FURNACES, oxygen content of bath samples, 378*A.*

ACID OPEN-HEARTH PRACTICE, effect of working conditions on slag inclusions, 287 *Paper.*

ACIDS:
- corrosion of iron, 127*A.*
- corrosion of steel, effect of organic substances, 196*A.*

ADAMITE ROLLS, 210*A.*

ADMIRALTY LABORATORIES, 186*A.*

AGE-HARDENING, strain-, mild steel, 341 *Paper.*

AGEING:
- chromium-nickel-silicon steel, 49*A.*
- chromium-nickel-tungsten steel, 49*A.*
- effect on iron-aluminium-nickel alloys, magnetic properties, 296*A.*
- heat-resistant steel, 49*A.*
- quench-, chromium-nickel steel, 162*A.*
- quench-, non-ferrous alloys, 162*A.*
- quench-, steel, 509*P.*
- strain-, strip for automobile bodies, 387 *Paper.*

AGGLOMERATES, use in blast furnaces, 82*A.*

AIRCRAFT CONSTRUCTION:
- use of nickel steel, 302*A.*
- weldability of sheets, 228*A.*

AIRCRAFT PARTS, forging, 347*A.*

AIRCRAFT VALVES, chromium-manganese-nickel-silicon steel for, 184*A.*

AKRILL, C., & Co., LTD., foundry plant, 210*A.*

ALBION MALLEABLE IRON Co., foundry plant, 14*A.*

ALITISED COATINGS, breakdown, 169*A.*, 291*A.*

ALKALIES, action on refractory materials, 325*A.*

ALKAZID PROCESS for sulphur recovery from coke-oven gas, 140*A.*

ALLOTROPIC CHANGES, cast-iron, 54*A.*

ALLOY STEELS RESEARCH COMMITTEE, Second Report. *Summary*, 535*P.* *Discussion*, 547*P.* *Correspondence*, 567*P.* *Committee's Reply*, 583*P.*

ALLOYS:
- Alnico, magnetic properties, 202*P.*
- aluminium-chromium, vacuum melting, 53*A.*
- brittleness at low temperatures, 300*A.*
- copper-nickel, use for valves, 185*A.*
- copper-nickel-tin, for coatings on steel, 301*A.*
- corrosion-resistant, properties, 66*A.*
- density, 146*A.*

ALLOYS (*contd.*)—
FF. properties, 119*A*.
high-permeability, 298*A*.
iron-aluminium, vacuum melting, 53*A*.
iron-aluminium-cobalt-nickel, magnetic properties, 202*P*.
iron-aluminium-copper-nickel, magnetic properties, 199*P*.
iron-aluminium-nickel, magnetic properties, 187 *Paper*, 113*A*., 362*A*.
iron-aluminium-nickel, magnetic properties, effect of ageing, 296*A*.
iron-aluminium-nickel, magnetic properties, effect of elements, 178*A*.
iron-aluminium-nickel, magnetic properties, effect of titanium and molybdenum, 52*A*.
iron-aluminium-silicon, magnetic properties, 112*A*.
iron-carbon, cooling rate, effect of carbon, 191*A*.
iron-chromium-nickel, brittleness after long-time annealing, 307*A*.
iron-chromium-nickel, magnetic properties, 308*A*.
iron-chromium-nickel, effect of molybdenum, 67*A*.
iron-chromium-nickel, heat resistance, 183*A*.
iron-chromium-nickel, properties, 184*A*.
iron-chromium-nickel, use for valves, 185*A*.
iron-cobalt, transformations, 577*P*., 592*P*., 374*A*.
iron-cobalt-nickel, transformations, 243*A*.
iron-copper-molybdenum, hardness, 296*A*.
iron-copper-molybdenum, magnetic properties, 296*A*.
iron-copper-nickel, magnetic properties, 113*A*.
iron-copper-nickel, magnetic properties, effect of segregation, 243*A*.
iron-nickel, delta region, 374*A*.
iron-nickel, electrical properties, 298*A*.
iron-nickel, magnetic properties, 117*A*., 179*A*., 233*A*., 298*A*.
iron-nickel, thermal expansion, 179*A*.
iron-silicon, electrical resistance, 362*A*.
ALLOYS (*contd.*)—
iron-silicon, magnetic properties, 233*A*.
magnetic, developments in Russia, 178*A*.
NCT. properties, 119*A*.
nickel, use for electrical equipment, 117*A*., 118*A*., 302*A*.
nickel, use for magnets, 298*A*.
non-ferrous, quench-ageing, 162*A*.
non-ferrous, tensile-torsion tests, 173*A*.
Y, frettage corrosion, 377*A*.
ALNICO ALLOYS, magnetic properties, 202*P*.
ALPLATE PROCESS of coating wire, 169*A*.
ALUMINA REFRACTORIES. *See* Refractory Materials.
ALUMINIUM :
brittleness at low temperatures, 300*A*.
corrosion, effect of electrolytes, 195*A*.
density, 146*A*.
determination in iron & steel, 248*A*.
determination in steel, spectrum analysis, 225*P*.
effect in galvanising, 170*A*.
effect in steel, 300*A*.
effect in transformer steel, 114*A*.
rolling, effect of reduction, direction of rolling and roll diameter, 155*A*.
X-ray examination, secondary radiation, 305*A*.
ALUMINIUM-CHROMIUM ALLOYS, vacuum melting, 53*A*.
ALUMINIUM - CHROMIUM - SILICON STEEL :
annealing, 43*A*.
drawing, 43*A*.
rolling, 43*A*.
ALUMINIUM-CHROMIUM STEEL, behaviour in drop-forging, 152*A*.
ALUMINIUM COATINGS, 291*A*.
production, Alplate process, 169*A*.
ALUMINIUM-MANGANESE STEEL, magnetic and electrical properties, 53*A*.
ALUMINIUM-NICKEL STEEL :
effect of copper, 179*A*.
magnetic properties, 52*A*., 112*A*.
magnetic properties, effect of ageing, 296*A*.
ALUMINIUM STEEL :
behaviour in drop-forging, 152*A*.
creep, effect of manufacturing variables, 44*A*.
strain-age-hardening, 368*P*.

AMERICAN COAL, coking properties, 139*A*., 334*A*.
AMERICAN ROLLING MILL CO., launder coal-washing plant, 8*A*.
AMMONIA PLANT, steels for, 235*A*.
AMMONIUM NITRATE, corrosion of steel, 127*A*.
AMORPHOUS STATE, metals, 189*A*.
ANALYSIS, 128*A*., 248*A*., 378*A*.
iron and steel, bibliography, 248*A*.
spectrum, 211 *Paper*, 129*A*., 249*A*., 384*A*.
spectrum, chromium-molybdenum-nickel steel, 242*P*.
spectrum, determination of aluminium in steel, 225*P*.
spectrum, determination of bismuth in brass, 221*P*.
spectrum, determination of carbon in iron, 383*A*.
spectrum, determination of chromium in steel, 230*P*., 234*P*.
spectrum, determination of cobalt in steel, 225*P*.
spectrum, determination of copper in steel, 224*P*., 225*P*.
spectrum, determination of manganese in steel, 232*P*.
spectrum, determination of molybdenum in steel, 235*P*.
spectrum, determination of nickel in steel, 224*P*., 231*P*.
spectrum, determination of silicon in steel, 225*P*., 233*P*.
spectrum, determination of titanium in steel, 225*P*.
spectrum, determination of tungsten in steel, 225*P*.
spectrum, determination of vanadium in steel, 234*P*.
thermal, steel, 373*A*.
use of polarograph, 248*A*.
ANALYTICAL REAGENTS, recovery, 249*A*.
ANDALUSITE. *See* Refractory Materials.
ANNEALING :
aluminium-chromium-silicon steel, 43*A*.
chromium-nickel steel strip, 23*A*.
chromium-steel strip, 23*A*.
cold-rolled strip, 282*A*., 354*A*.
cold-worked steel, 26*A*.
effect on chromium steel, hardness, 296*A*.
effect on iron-chromium-nickel alloys, brittle structure, 307*A*.
effect on steel, 161*A*.
low-temperature, cold-drawn steel, 26*A*.
ANNEALING (*contd.*)—
malleable cast iron, 85*A*., 144*A*.
malleable cast iron, acceleration by magnetic treatment, 145*A*.
malleable cast iron, short cycle, 270*A*.
sheets, prevention of stickers, 283*A*.
silicon-steel strip, 25*A*.
stainless-steel wire, 225*A*.
steel, 101*A*.
uncooled alloy-steel ingots, 25*A*.
welded boiler plate, 286*A*.
wire, 161*A*.
ANNEALING FURNACES, 24*A*.
bright, 22*A*.
controlled atmospheres, 22*A*., 161*A*.
conveyor equipment, lubrication, 223*A*.
electric, 161*A*.
for steel castings, 26*A*.
temperature measurement, 354*A*.
ANNUAL DINNER, report, 18*P*.
ANNUAL MEETING, proceedings, 1*P*.
ANTHRACITE, ignition point, 331*A*.
APPLEBY-FRODINGHAM STEEL CO., LTD., section mills, 321 *Paper*.
ARMCO IRON, cyaniding, 282*A*.
ARSENIC :
effect in dynamo steel, 181*A*.
effect in steel, 368*A*.
effect in transformer steel, 181*A*.
ASSOCIATES, election, 15*P*.
ATMOSPHERES :
control, annealing furnaces, 22*A*., 161*A*.
control, heat-treatment furnaces, 22*A*., 23*A*., 100*A*.
ATOMIC STRUCTURE, metals, 121*A*.
AUSTENITE :
decomposition, 63*A*.
definition, 188*A*.
transformation in cast iron, 307*A*.
transformation in chromium-nickel steel, 192*A*.
transformation in high-speed steel, 192*A*.
transformation, isothermal, 64*A*.
AUSTENITE GRAINS, primary, effect on steel, 372*A*.
AUSTRALIA, iron ore deposits, 75*A*.
AUSTRALIAN IRON AND STEEL, LTD. :
bar mills, 221*A*.
blast-furnace-gas cleaning plant, 454*P*.
blast-furnace plant, 142*A*.
boiler plant, 443*P*.
open-hearth plant, 87*A*.
AUSTRIA. *See* Ostmark.
AUTOFRETTAGE, tubes, stresses and deformations, 46*A*.

AUTOMOBILE AXLES, carburising, 100*A*.
AUTOMOBILE BODIES, pressing, 152*A*., 347*A*.
AUTOMOBILE CASTINGS, manufacture, 211*A*., 340*A*.
AUTOMOBILE CRANKSHAFTS, manufacture, 24*A*.
AUTOMOBILE CYLINDER BLOCKS, wear, 177*A*.
AUTOMOBILE INDUSTRY, use of nickel cast iron, 301*A*.
AUTOMOBILE PARTS, heat treatment, 159*A*., 160*A*.
AUTOMOBILE STEEL :
German, 160*A*.
strain-ageing, 387*P*.
AUTOMOBILE TIE-RODS, forging, 151*A*.
AXLES :
automobile, carburising, 100*A*.
properties, 303*A*.

BAIRD, WM., & CO. LTD., blast-furnace turbo-blower, 336*A*.
BALDWINS, LTD., sheet mills, 351*A*.
BAR MILLS, 221*A*., 350*A*.
BARS, straightening machines, Robertson, 222*A*.
BASIC BESSEMER PROCESS :
control of refining action by waste-gas analysis, 16*A*.
effect of pig iron variations, 207*A*.
BASIC BESSEMER STEEL, deoxidation with basic pig iron, 88*A*.
BASIC ELECTRIC STEEL, compared with acid electric steel, 90*A*.
BASIC OPEN-HEARTH FURNACES :
design, 319*A*.
ports, Friedrich, 319*A*.
ports, Maerz, 319*A*.
ports, Venturi, 319*A*.
refractory materials, 318*A*., 319*A*.
sloping walls, 319*A*.
suspended roofs, 319*A*.
use of chrome bricks, 319*A*.
use of chrome-magnesite bricks, 319*A*., 322*A*.
use of dolomite, 319*A*.
use of forsterite, 319*A*.
use of magnesite bricks, 319*A*.
use of silica bricks, 318*A*., 319*A*.
use of silica cement, 319*A*.
BASIC OPEN-HEARTH PROCESS :
behaviour of carbon, 277*P*.
behaviour of chromium, 273*P*.
behaviour of iron oxide, 278*P*.
behaviour of manganese, 273*P*., 148*A*.
BASIC OPEN-HEARTH PROCESS (*contd.*)
behaviour of nickel, 276*P*.
behaviour of phosphorus, 276*P*.
behaviour of sulphur, 148*A*.
effect of fluorspar, 257 *Paper*.
physical chemistry, 282*P*.
BASIC SLAGS, constitution and viscosity, 319*A*.
BASTAR STATE, iron ore deposits, 316*A*.
BEARDMORE, WM., & CO., LTD., forging plant, 347*A*.
BEARINGS :
ball, use of chromium steel, 240*A*.
composition, 220*A*.
metal and synthetic-resin, 156*A*.
metals for, 155*A*.
roller, fatigue, 112*A*.
roller, suitability of heavy loads, 278*A*.
synthetic resin, 277*A*.
BEND FATIGUE STRENGTH :
welded chromium-molybdenum steel tubes, 227*A*.
welds, 167*A*.
BEND TEST BARS, stress measurement, X-ray methods, 110*A*.
BEND TESTS :
alternating effect of time on internal stresses, 42*A*.
cast iron, 109*A*.
BENZOL, recovery from coke-oven gas, 9*A*., 205*A*.
BERYLLIUM :
determination in iron and steel, 248*A*.
effect in chromium-nickel steel, 303*A*.
effect in transformer steel, 114*A*.
BESSEMER GOLD MEDAL, awarded to J. Henderson, 9*P*.
BESSEMER PROCESS :
acid, 342*A*.
basic, control of refining action by waste gas analyses, 16*A*.
basic, effect of pig iron variations, 207*A*.
BESSEMER STEEL :
basic, deoxidation with pig iron, 88*A*.
compared with open-hearth steel, 360*A*.
BETHLEMEM STEEL CO. :
forging plant, 218*A*.
sheet mill, 350*A*.
BIBLIOGRAPHY, 131*A*., 255*A*., 392*A*.
analysis of iron and steel, 248*A*.
coal utilisation, 7*A*.
impact tests of welded joints, 42*A*.
inclusions in steel, 180*A*.

BIBLIOGRAPHY (*contd.*)—
protection of metal surfaces, 290*A*.
scaling and decarburisation of steel, 100*A*.
solidification and structure of rimming steel, 215*A*.
temperature gradient determination of ingot moulds, 344*A*.
thermal expansion of refractory materials, 2*A*.
welding of coated steel, 357*A*.
welding of molybdenum steel, 165*A*.
BISMUTH, determination in brass, spectrum analysis, 221*P*.
BLACKING, use for foundry facings, 85*A*.
BLAST, pressure, effect in cupolas, 269*A*.
BLAST-FURNACE GAS :
cleaning 454*P*., 81*A*., 265*A*.
cleaning, Brassert machine, 337*A*.
surplus, burning, 206*A*.
use under boilers, 445*P*.
use for lime burning, 81*A*.
BLAST-FURNACE LININGS :
behaviour in service, 323*A*.
refractory materials, 659*P*., 262*A*.
temperature measurement, 330*A*.
wear, 79*A*.
BLAST-FURNACE PLANT :
Australian Iron & Steel, Ltd., 142*A*.
Colvilles, Ltd., 206*A*.
Great Lakes Steel Corporation, 87*A*.
Petrovskiy Works, 266*A*.
Republic Steel Corporation, 265*A*.
steam distribution, 466*P*.
BLAST-FURNACE SLAG :
action on refractory materials, 324*A*.
melting point and viscosity, effect of calcium sulphide, 267*A*.
BLAST-FURNACE STOVES :
design, 206*A*.
use of spherical refractories, 265*A*.
BLAST-FURNACES :
blast pressures, effect of changes, 337*A*.
control instruments, 142*A*.
design, 82*A*., 265*A*.
early, Canada, 208*A*.
early, Pennsylvania, 143*A*.
efficiency in relation to equilibrium of reactions, 337*A*.
gas flow, 337*A*.
gas flow, effect of lumpiness of charge, 266*A*.
operation at Zaporozhstal, 265*A*.
BLAST-FURNACES (*contd.*)—
reduction of silicon and titanium, 266*A*.
smelting fine ores, 207*A*., 266*A*., 337*A*.
smelting low-grade ore, 142*A*., 207*A*.
smelting low-grade ore, cost calculation, 82*A*.
smelting low-grade ore, effect on power supply, 337*A*.
stock distribution, 337*A*.
stock distribution, effect on working, 206*A*.
stock movement, 11*A*.
tops, McKee, 336*A*.
turbo blowers, 336*A*.
tuyeres, 265*A*.
use of agglomerates, 82*A*.
use of charcoal, 6*A*.
use of recuperators, 5*A*., 10*A*., 82*A*.
use of sinter, 337*A*.
welded, 336*A*.
BLOOMING MILLS. *See* Cogging Mills.
BLOOMS, removal of defects by flame scarfing, Lin-De-Surfacer Machine, 21*A*.
BLOWERS :
for sand-blasting, 272*A*.
turbo, for blast-furnace, 336*A*.
BOCHUMER VEREIN, welded blast-furnace, 336*A*.
BOILER PLANT, Australian Iron and Steel, Ltd., 443*P*.
BOILER PLATES :
embrittlement, 516*P*.
failure, 175*A*.
intercrystalline cracking, 231*A*., 376*A*.
rimming steel for, 275*A*.
welded, annealing, 286*A*.
BOILER STEEL, properties at high temperatures, 366*A*.
BOILER TUBES, failure, 175*A*.
BOILERS :
blast-furnace-gas-fired, 445*P*.
coke-breeze-fired, 447*P*., 462*P*.
corrosion, 68*A*.
corrosion by combustion products, 127*A*.
pulverised-coal-fired, 448*P*.
temperature measurement, 98*A*.
use of manganese steel, 185*A*.
welding, 103*A*., 163*A*.
BONDERISING, 66*A*.
BOOK NOTICES :
Bullens, D. K., "Steel and its Heat Treatment," vol. 1, 250*A*., Vol. 2, 386*A*.

BOOK NOTICES (*contd.*)—
Burt, H. J., "Steel Construction," 71*A*.
Carpenter, Sir H., and J. M. Robertson, "Metals," 310*A*.
Deutsche Gesellschaft für Metallkunde, "Vorträge der Hauptversammlung 1938," 310*A*.
"Deutsches Bergbau-Jahrbuch," 387*A*.
Haddan, R., "Trade Marks," 387*A*.
Hale, R. S., "Welded Steel Construction," 311*A*.
Hanemann and Schrader, "Atlas Metallographicus," Band II, 312*A*.
Hildage, H. T., T. G. Marple, and F. L. Meyenberg, "New Management," 72*A*.
Hoff, H., "Die Hüttenwerksanlagen," Band 1, 251*A*.
Imperial Institute, "Manganese," 71*A*.
Johnson, C. G., "Forging Practice," 252*A*.
Kehl, G. L., "Principles of Metallographic Laboratory Practice," 388*A*.
Krause, H., "Metal Coloring and Finishing," 197*A*.
Low, D. A., "Pocket Book for Mechanical Engineers," 252*A*.
Manchester Assoc. of Engineers, "Some Episodes in the Manchester Association of Engineers," 388*A*.
Marsh, J. S., "Alloys of Iron and Nickel," vol. 1, "Special Purpose Alloys," 197*A*.
Niezoldi, Otto, "Ausgewählte chemische Untersachungsmethoden für die Stahl- und Eisenindustrie," 389*A*.
Puppe, J., "Walzwerkswesen," Band III, 390*A*.
Reicherter, G., "Der Kugeldruckversuch nach Brinell, die Harteprüfung mit Vorlast, und die Härteprüfung nach Vickers," 130*A*.
Schiebold, E., "Spannungsmessung an Werkstücken," 73*A*.
Skerry, E., "Testing of Metallic Materials," 253*A*.
Sweetser, R. H., "Blast Furnace Practice," 312*A*.
Tibbenham, L., "Welding of Cast Iron," 391*A*.
BOOK NOTICES (*contd.*)—
United States Steel Corporation, "Sampling and Analysis of Carbon and Alloy Steel," 313*A*.
Verein deutscher Eisenhüttenleute, "Handbuch für das Eisenhüttenlaboratorium," Band 1, 253*A*.
Weihrich, R., "Die Chemische Analyse in der Stahlindustrie," 314*A*.
Wundram, O., "Elektrowärme in der Eisen- und Metallindustrie," 254*A*.
BORON :
determination in iron and steel, 248*A*.
effect in cast iron, graphitisation, 180*A*.
BORON CARBIDE, cemented, properties, 225*A*.
BORON-NICKEL CAST IRON, properties, 55*A*.
BRACKELSBERG FURNACE, 14*A*.
BRADLEY AND FOSTER METHOD of refining pig iron, 143*A*.
BRAKE DRUMS, wear, 297*A*.
BRASS :
brittleness at low temperatures, 300*A*.
determination of bismuth, spectrum analysis, 221*P*.
electric melting furnace, 14*A*.
electrodeposition, 66*A*.
frettage corrosion, 377*A*.
rolling, effect of reduction, direction of rolling and roll diameter, 155*A*.
BRASSERT GAS WASHER, 337*A*.
BRASSERT PROCESS, pig iron manufacture, 11*A*.
BRAZING :
alloy steel, 227*A*.
use of electric furnaces, 165*A*.
BRITTLENESS :
heat-resistant steel at high temperatures, 299*A*.
iron-chromium-nickel alloys, after long-time annealing, 307*A*.
metals at low temperature, 300*A*.
pickling, effect of time of immersion, 232*A*.
temper-, chromium-nickel steel, 102*A*.
temper-, nickel steel, 102*A*.
BRONZE, brittleness at low temperatures, 300*A*.
BROWN, BAYLEY'S STEEL WORKS, LTD., plant, 273*A*.

BROWN-FIRTH RESEARCH LABORATORIES, vacuum fusion furnace for determination of oxygen, 379*A*.
BULGARIA :
iron ore deposits, 316*A*.
iron and steel works, 316*A*.
BURNERS, Gako, 140*A*.
BURNING TEMPERATURE, effect on refractory bricks porosity, 78*A*.
BUSCH METAPHOT MICROSCOPE, 187*A*.

CADMIUM :
effect in zinc coatings, 171*A*.
electrodeposition, 66*A*., 290*A*.
CALCIUM NITRATE, corrosion of steel, 127*A*.
CALCIUM SULPHIDE, effect on blast-furnace slag, melting point and viscosity, 267*A*.
CAMERA, Finch electron diffraction, 121*A*., 370*A*.
CAMPINE BASIN, chemistry and petrography of coal seams, 80*A*.
CAMSHAFTS, surface-hardening, 224*A*.
CANADA :
early blast-furnaces, 208*A*.
iron industry, 87*A*.
CANNED FOODS, early types, examination, 70*A*.
CARBIDES :
cemented, properties, 225*A*.
distribution in chromium steel, 121*A*.
CARBON :
activated, use in electrodeposition of nickel, 290*A*.
behaviour in basic open-hearth process, 277*P*.
determination in iron and steel, 248*A*.
determination, spectrum analysis, 383*A*.
effect in carbon steel, cooling rate, 191*A*.
effect in cast iron, 236*A*.
effect in iron-carbon alloys, cooling rate, 191*A*.
effect in steel, corrosion, 194*A*.
reaction with hydrogen in iron, 189*A*., 306*A*.
reduction of iron ore in solid state, 10*A*.
CARBON STEEL :
brittleness at low temperatures, 300*A*.
cooling rate, effect of carbon, 191*A*.
CARBON STEEL (*contd.*)—
creep, 45*A*.
delta region, 373*A*.
effect of grain size, 185*A*.
impact tests, 173*A*.
magnetic saturation point, 51*A*.
properties, 41*A*.
properties at high temperatures, 114*A*.
weldability, 105*A*.
CARBON-STEEL SPRINGS, properties, 57*A*.
CARBONISATION :
low-temperature, 205*A*.
mechanism, 9*A*.
CARBONISING, conditions, effect on coke properties, 75 *Paper*.
CARBORUNDUM REFRACTORIES. *See* Refractory Materials.
CARBURISING :
automobile axles, 100*A*.
steel, 225*A*.
use of propane, 281*A*.
CARBURISING AGENTS, use of peat coke, 159*A*.
CARBURISING FURNACES, muffleless type, 223*A*.
CARDILLAC CO., carburising of automobile axles, 100*A*.
CARNEGIE GOLD MEDAL :
awarded to W. Ruff, 12*P*.
awarded to J. White, 12*P*.
CARNEGIE-ILLINOIS STEEL CORPORATION :
plate mills, 95*A*.
power plant, 331*A*.
sheet and strip mills, 157*A*.
steel plant, 16*A*.
strip mills, 221*A*., 278*A*., 279*A*.
CARNEGIE RESEARCH GRANTS, awards, 37*P*.
CASCADYN COAL WASHER, 203*A*.
CASE HARDENING, nickel steel, 281*A*.
CASE-HARDENING STEEL, chromium-nickel, properties, 184*A*.
CAST IRON :
allotropic changes, 54*A*.
alloy, properties, 368*A*.
analysis, 128*A*.
austenite transformation, 307*A*.
bend tests, 109*A*.
boron-nickel, properties, 55*A*.
chromium, effect of titanium, 142*P*.
chromium, properties, 183*A*.
chromium-nickel, heat treatment, 160*A*.
chromium-nickel, manufacture, 338*A*.
chromium-nickel, properties, 115*A*.

CAST IRON (*contd.*)—
corrosion in gases, 245*A*.
damping capacity, 54*A*., 237*A*.
density, 146*A*.
determination of copper, 128*A*.
effect of caustic soda, 209*A*.
effect of chromium, 116*A*.
effect of chromium and silicon, 300*A*.
effect of copper, 116*A*.
effect of elements, 236*A*.
effect of ferro-titanium and ferro-silicon additions, 115*A*.
effect of lead, 236*A*.
effect of molybdenum, 116*A*.
effect of nickel, 116*A*.
effect of silicon carbide, 360*A*.
effect of titanium, 116*A*.
effect of vanadium, 116*A*.
elastic properties, 359*A*.
elasticity tests, 109*A*.
enamelling, 293*A*.
expansion and contraction, 54*A*.
fluidity and strength, effect of soda ash, 209*A*.
fracture, 109*A*.
graphitisation, 61*A*., 116*A*., 122*A*.
graphitisation, effect of elements, 180*A*.
growth, 46*A*., 182*A*., 236*A*.
hardness control, 116*A*.
high-duty, Emmel process, 338*A*.
high-duty, Lanz-Perlit Process, 209*A*., 338*A*.
high duty, manufacture, 209*A*.
high-duty, properties, 116*A*., 182*A*., 237*A*.
impact tests, 109*A*.
inclusions, 189*A*., 242*A*.
loded, properties, 182*A*., 209*A*.
low-carbon, casting, 271*A*.
machinability, 237*A*.
magnetic tests, 109*A*.
malleable, *See* Malleable Cast Iron.
molten, effect of moisture on ability to retain iron carbide, 144*A*.
molybdenum-nickel, manufacture, 338*A*.
nickel, corrosion resistance, 301*A*.
nickel, manufacture, 338*A*.
nickel, properties, 54*A*., 112*A*., 115*A*.
nickel, properties at high temperatures, 301*A*.
nickel, use in automobile industry, 301*A*.
nickel, use for internal combustion engines, 301*A*.
nickel, wear, 301*A*.
CAST IRON (*contd.*)—
nitriding, 353*A*.
occluded gases, 54*A*.
properties, 123*A*., 301*A*.
scaling, 182*A*.
shear tests, 109*A*.
solution rate of graphite, 306*A*.
surface hardening, 159*A*.
tensile strength, relation to structure, 116*A*.
tensile-torsion tests, 173*A*.
tests, use of ring-shaped specimens, 116*A*.
torsion tests, 110*A*.
use for internal-combustion engines, 115*A*.
use for steam-engine cylinders, 115*A*.
use for turbine housings, 115*A*.
wear, 177*A*., 232*A*., 297*A*.
welding, 357*A*.
white, for coatings on steel, 301*A*.
white, malleablisation, 210*A*.
CAST STEEL, cooling rate, effect on structure, 191*A*.
CASTING :
centrifugal, gear blanks, 85*A*.
ingots, Durville process, 297 *Paper*.
low-carbon iron, 271*A*.
CASTING PITS, refractory material, 318*A*.
CASTINGS :
automobile, manufacture, 211*A*., 340*A*.
chilled, production, 237*A*.
chromium-nickel steel, surface cracks, 61*A*.
cleaning, 272*A*., 340*A*.
cleaning prior to enamelling, 340*A*.
compared with welded parts, 28*A*., 226*A*., 357*A*.
cooling pits, 272*A*.
gating and feeding, 85*A*.
for gear blanks, specification, British, 244*A*.
iron, defects, 86*A*.
light, manufacture, 145*A*.
malleable-iron, straightening, 270*A*.
nickel steel, properties, 302*A*.
refinement of structure, 61*A*.
risers, removal by oxy-acetylene cutting, 106*A*.
slow-cooling, use of insulating materials, 319*P*.
steel, annealing furnaces, 26*A*.
steel, design, 271*A*.
steel, for locomotive frames, 13*A*.
steel, manufacture, 340*A*.
welding, 163*A*.

CAUSTIC SODA :
effect on cast iron, 209*A*.
use for the desulphurisation of iron, 10*A*., 11*A*.
CAVITATION :
iron and steel, 125*A*.
marine propellers, 126*A*.
metals, 247*A*.
CEMENT :
jointing. *See* Refractory Materials.
silica. *See* Refractory Materials.
use in moulding sand, Randupson method, 339*A*.
CEMENTITE, magnetic saturation point, 51*A*.
CENTRIFUGAL CASTING, gear blanks, 85*A*.
CENTRIFUGAL REFINING, pig iron, 143*A*.
CERIUM, effect in cast iron, graphitisation, 180*A*.
CHANNELS, rolling, 325*P*.
CHAPMANISING, steel, 225*A*.
CHARCOAL, use in blast-furnaces, 6*A*.
"CHAR-MO" Heat-Treatment Furnace, 223*A*.
CHECKER BRICKS. *See* Refractory Materials.
CHEMICAL INDUSTRY :
durability of cast-iron kettles, 125*A*.
temperature measurement, 98*A*.
CHEMICO PROCESS for recovery of pickling liquor, 34*A*.
CHEMISTRY, coal, 80*A*.
CHESTERFIELD TUBE CO., tube-drawing plant, 222*A*.
CHILLED CASTINGS, production, 237*A*.
CHILLED ROLLS :
cracks, 210*A*.
manufacture and properties, 85*A*., 210*A*.
CHINA :
coal deposits, 317*A*.
iron ore deposits, 199*A*.
CHINESE COAL, carbonisation, low-temperature, 205*A*.
CHROMAL, working and properties, 43*A*.
CHROME-ALUMINA BRICKS. *See* Refractory Materials.
CHROME BRICKS. *See* Refractory Materials.
CHROME-MAGNESITE BRICKS. *See* Refractory Materials.
CHROME-MAGNESITE-DOLOMITE MIXTURES. *See* Refractory Materials.
CHROME ORE, mining, 75*A*.
CHROME ORE DEPOSITS, Southern Rhodesia, 75*A*.
CHROME-SILICA BRICKS. *See* Refractory Materials.
CHROMIUM :
behaviour in basic open-hearth process, 273*P*.
determination in iron and steel, 248*A*.
determination in steel, spectrum analysis, 230*P*., 234*P*.
effect in cast iron, 116*A*., 236*A*., 300*A*.
effect in steel, hydrogen attack, 126*A*.
effect in steel, transformations, 374*A*.
electrodeposition, 66*A*.
electrodeposition, on tinplate, 35*A*., 171*A*.
electrodeposition, from trivalent salt solutions, 36*A*.
frettage corrosion, 377*A*.
welding, effect of nitrogen, 138*P*.
CHROMIUM CARBIDE, cemented, properties, 225*A*.
CHROMIUM CAST IRON :
effect of titanium, 142*P*.
properties, 183*A*.
CHROMIUM - COBALT - MOLYBDENUM STEEL, magnetic properties, 51*A*., 113*A*.
CHROMIUM-COBALT-TUNGSTEN STEEL, magnetic properties, 51*A*.
CHROMIUM - COPPER - MOLYBDENUM-NICKEL STEEL, properties, 55*A*.
CHROMIUM - COPPER - MOLYBDENUM STEEL, creep limit, 44*A*.
CHROMIUM-COPPER STEEL :
properties, 235*A*.
welded, fatigue and impact tests, 43*A*.
CHROMIUM-MAGNET STEEL, properties, 234*A*.
CHROMIUM-MANGANESE DIE STEEL, heat treatment, dimensional changes, 102*A*.
CHROMIUM-MANGANESE-MOLYBDENUM-SILICON STEEL, weldability for aircraft construction, 228*A*.
CHROMIUM-MANGANESE-MOLYBDENUM STEEL, properties, 55*A*., 117*A*.
CHROMIUM - MANGANESE - NICKEL-SILICON STEEL, use for aircraft valves, 184*A*.
CHROMIUM - MANGANESE - SILICON-TUNGSTEN STEEL, properties, 184*A*.

CHROMIUM-MANGANESE STEEL :
brittleness at low temperatures, 300*A*.
corrosion, 67*A*.
corrosion in sulphur-bearing gases, 195*A*.
CHROMIUM - MANGANESE - TUNGSTEN STEEL, properties, 55*A*., 117*A*.
CHROMIUM - MOLYBDENUM - NICKEL STEEL :
fatigue at high temperatures, 47*A*.
heating and cooling curves, 373*A*.
properties, 117*A*., 119*A*.
spectrum analysis, 242*P*.
temper-hardening, 283*A*.
transformations, 559*P*.
CHROMIUM - MOLYBDENUM - NICKEL-VANADIUM STEEL :
segregation, 375*A*.
temper-hardening, 283*A*.
CHROMIUM-MOLYBDENUM STEEL :
brittleness at high temperatures, 299*A*.
fatigue strength, effect of shape and structure of specimen, 176*A*.
properties, 235*A*., 369*A*.
welding, 104*A*.
CHROMIUM - MOLYBDENUM STEEL SCRAP, melting in arc furnaces, 17*A*.
CHROMIUM - MOLYBDENUM STEEL TUBES :
heat treatment by electric currents, 160*A*.
welded, bend fatigue strength, 227*A*.
CHROMIUM - MOLYBDENUM STEEL WIRE, fatigue strength, effect of decarburisation, 48*A*.
CHROMIUM - MOLYBDENUM - VANADIUM STEEL :
nitriding, 225*A*.
properties, 235*A*.
CHROMIUM-NICKEL CASE-HARDENING STEEL, properties, 184*A*.
CHROMIUM-NICKEL CAST IRON :
manufacture, 338*A*.
properties, 115*A*.
CHROMIUM-NICKEL-SILICON STEEL, ageing, 49*A*.
CHROMIUM-NICKEL STEEL :
austenite transformation, 192*A*.
brittleness at low temperatures, 300*A*.
cold-drawn, heat treatment, 101*A*.
corrosion in sulphur-bearing gases, 195*A*.
corrosion in water, 246*A*.
CHROMIUM-NICKEL STEEL (*contd.*)—
creep under static and repeated stresses, 46*A*.
effect of grain size, 62*A*.
effect of titanium and beryllium, 303*A*.
elastic limit/temperature curve, 359*A*.
fatigue at high temperatures, 47*A*.
heating and cooling curves, 373*A*.
inverse rate curves, 166*P*.
nitrogen-bearing, properties, 141*P*.
properties, 117*A*., 239*A*., 302*A*., 303*A*.
quench-ageing, 162*A*.
scaling, effect of sulphur-bearing gases, 282*A*., 354*A*.
spot welding, 104*A*.
temper-brittleness, 102*A*.
temper-hardening, 283*A*.
thermal expansion, 117*A*.
use for internal combustion engines, 302*A*.
use for marine engines, 302*A*.
welding, 28*A*.
CHROMIUM-NICKEL STEEL CASTINGS, surface cracks, 61*A*.
CHROMIUM-NICKEL STEEL SCRAP, melting in arc furnaces, 17*A*.
CHROMIUM-NICKEL STEEL STRIP, annealing, 23*A*.
CHROMIUM - NICKEL - TUNGSTEN STEEL :
ageing, 49*A*.
properties, 239*A*.
CHROMIUM-SILICON STEEL :
heat treatment, 161*A*.
properties, 56*A*., 57*A*., 119*A*., 185*A*.
CHROMIUM-SILICON-TUNGSTEN STEEL, properties, 56*A*., 57*A*.
CHROMIUM - SILICON - VANADIUM STEEL, properties, 118*A*.
CHROMIUM STEEL :
behaviour in drop forging, 152*A*.
carbide distribution, 121*A*.
corrosion in sulphur-bearing gases, 195*A*.
effect of nitrogen and heat-treatment, 99 *Paper*, 137*P*.
effect of titanium, 142*P*.
grain size, 123*A*.
hardness, effect of annealing, 296*A*.
nitrogen-bearing, corrosion, 132*P*.
nitrogen-bearing, forging, 109*P*.
nitrogen-bearing, heat resistance, 131*P*.
nitrogen-bearing, machinability, 132*P*.
structure, 123*A*.

CHROMIUM STEEL (*contd.*)—
use for roller and ball bearings, 240*A*.
uses, 301*A*.
welding, 28*A*.
CHROMIUM STEEL STRIP, annealing, 23*A*.
CHROMIUM-TITANIUM STEEL, properties, 235*A*.
CHROMIUM-TUNGSTEN STEEL, cold-drawn, heat treatment, 101*A*.
CHROMIUM - TUNGSTEN - VANADIUM STEEL :
austenite transformation, 192*A*.
properties, 186*A*.
CHROMIUM-VANADIUM SPRING STEEL :
manufacture, 94*A*.
properties, 57*A*.
CHROMIUM-VANADIUM STEEL, nitriding, 225*A*.
CHRYSLER CORPORATION, crankshaft manufacture, 24*A*.
CLAD STEEL :
flame culting, 30*A*.
manufacture, 291*A*.
tests, 35*A*.
CLAY PLANTS, wear of metals, 297*A*.
CLEANING :
blast-furnace gas, 454*P*., 81*A*., 265*A*.
blast-furnace gas, Brassert machine, 337*A*.
castings, 272*A*., 340*A*.
castings prior to enamelling, 340*A*.
coal, 7*A*., 203*A*.
coal, Cascadyn washer, 203*A*.
coal, efficiency of separation plants, 7*A*.
coal, efficiency of washing plants, 332*A*.
coal, Finkey-Bamert system, 204*A*.
coal, mechanism of launder separators, 7*A*.
coal, pneumatic process, 204*A*.
coal, slurry treatment, 204*A*.
coal, slurry treatment, Kirkless separator, 333*A*.
coal, Tromp process, 139*A*., 204*A*.
coal, United States, 200*A*.
metals, 33*A*., 168*A*., 289*A*.
CLYDE ALLOY STEEL CO., LTD., research laboratories, 41*A*.
COAL :
American, coking properties, 139*A*., 334*A*.
analysis, 129*A*.
breaking, 332*A*.
chemistry and petrography, 80*A*.
Chinese, carbonisation, low-temperature, 205*A*.
COAL (*contd.*)—
cleaning, 7*A*., 203*A*.
cleaning, Cascadyn washer, 203*A*.
cleaning, efficiency of separation plants, 7*A*.
cleaning, efficiency of washing plants, 332*A*.
cleaning, Finkey–Bamert system, 204*A*.
cleaning, mechanism of launder separators, 7*A*.
cleaning, pneumatic process, 204*A*.
cleaning, slurry treatment, 204*A*.
cleaning, slurry treatment, Kirkless separator, 333*A*.
cleaning, Tromp process, 139*A*., 204*A*.
cleaning, United States, 200*A*.
coalification, 333*A*.
combustion, effect of inorganic compounds, 5*A*., 203*A*.
constitution, 138*A*.
determination of moisture, 7*A*.
distillation, low-temperature, 139*A*.
grinding machinery, 203*A*.
hydrogenation, 335*A*.
hydrogenation, Fischer-Tropsch process, 9*A*.
ignition point, 331*A*.
oil production, 9*A*., 141*A*.
pulverised, 333*A*.
pulverised, use under boilers, 448*P*.
pulverised, use in furnaces, 14*A*., 338*A*.
Ruhr, coking properties, 8*A*.
sampling, 129*A*.
swelling, 8*A*., 138*A*., 139*A*., 264*A*., 334*A*.
utilisation, bibliography, 7*A*.
X-ray examination, 6*A*.
COAL ASH, reaction with coke-oven linings, 3*A*.
COAL DEPOSITS :
China, 317*A*.
France, 76*A*.
Germany, 199*A*.
Iraq, 76*A*.
Russia, 76*A*.
South Africa, 75*A*.
COAL DUST, use for foundry facings, 85*A*.
COAL HUMIC ACIDS, oxidation, 138*A*.
COAL SECTIONS, thin, preparation, 6*A*.
COAL-TAR PITCH, use for carburetting coke-oven gas, 140*A*.
COATED STEEL :
welding, 357*A*.
welding, bibliography, 357*A*.
COATING, metals, 35*A*., 169*A*., 290*A*.

COATINGS :
alitised, breakdown, 169*A*., 291*A*.
aluminium, 291*A*.
aluminium, Alplate process, 169*A*.
copper, adherence, 35*A*.
copper-nickel-tin alloys on steel, 301*A*.
Cromodising, 66*A*.
electrodeposited, standardisation, 290*A*.
galvanised, corrosion, 170*A*.
galvanised, thickness determination, 291*A*.
metallic, 66*A*.
nickel, adherence, 35*A*.
nickel, Hinrichsen process, 36*A*.
nickel, Schlötter process, 36*A*.
nickel, Weisberg and Stoddart process, 36*A*.
organic, adherence, 35*A*.
phosphate, 293*A*.
phosphate, Bonderising, 66*A*.
phosphate, Loxal process, 66*A*.
phosphate, Parkerising, 66*A*., 290*A*.
protective, corrosion tests, 196*A*.
protective, Curtin Howe Corporation process, 290*A*.
silver, adherence on steel, 36*A*.
stainless steel, adherence, 35*A*.
tin, discontinuities, 292*A*.
tin, flux inclusions, 171*A*.
white cast iron on steel, 301*A*.
zinc, 170*A*.
zinc, corrosion, 292*A*.
zinc, effect of cadmium, 171*A*.
zinc, effect of lead, 171*A*.
zinc, effect of mercury, 171*A*.
COBALT :
determination in iron and steel, 248*A*.
determination in steel, spectrum analysis, 225*P*.
effect in cast iron, graphitisation, 180*A*.
COBALT-MOLYBDENUM STEEL, magnetic properties, 52*A*.
COGGING MILLS, 278*A*.
edging rolls for, 221*A*.
roll-pass design, 19*A*.
rolling, 156*A*.
slab turning device, 222*A*.
COGNE CO., steel plant, 16*A*.
COILER for strip, 279*A*.
COILING MACHINES, for wire, 94*A*.
COKE :
consumption in cupolas, relation to flue gas composition, 269*A*.
peat, use in carburising, 159*A*.
properties, effect of carbonising conditions, 75 *Paper*.
COKE BREEZE, use under boilers, 447*P*., 462*P*.
COKE-OVEN GAS :
benzol recovery, 9*A*., 205*A*.
carburetted, use in open-hearth furnaces, 141*A*.
carburetting with coal-tar pitch, 140*A*.
sulphur recovery, Alkazid process, 140*A*.
sulphur recovery, Girbotol process, 140*A*.
sulphur recovery, Katasulf process, 140*A*.
sulphur recovery, Kohlentechnik process, 140*A*.
sulphur recovery, Lurgi process, 140*A*.
sulphur recovery, Pieters process, 140*A*.
COKE OVENS :
Collin, 8*A*.
design, 9*A*.
Koppers, 333*A*.
linings, reaction with coal ash, 3*A*.
Otto, 81*A*.
Simon-Carves Otto, 80*A*., 333*A*.
COKING, properties, American coal, 334*A*.
COKING INDUSTRY, United Kingdom, 204*A*., 264*A*.
COKING PLANTS :
Cokitalia, 80*A*.
Gutehoffnungshütte, 205*A*.
India, 264*A*.
Lambton, Hetton and Joicey Collieries, Ltd., 8*A*.
Mitchell Main Colliery, 80*A*.
steam distribution, 471*P*.
Tata Iron & Steel Works, 333*A*.
Turkey, 264*A*.
COKING PROCESS, effect on coke properties, 75 *Paper*.
COKING PROPERTIES :
American coal, 139*A*.
Ruhr coal, 8*A*.
COKITALIA, coking plant, 80*A*.
COLD-DRAWN STEEL :
heat-treatment, 101*A*.
low-temperature annealing, 26*A*.
COLD-HEADING PRACTICE, 93*A*.
COLD-PRESSED SHEETS, effect of die lubricant on subsequent painting, 39*A*.
COLD-PRESSING, suitability of sheets, determination by magnetic method, 153*A*.
COLD-ROLLED SHEETS, effect of heat treatment, 62*A*.

COLD-ROLLED STRIP, annealing, 282*A*., 354*A*.
COLD-ROLLING, 351*A*.
effect on transformer steel, magnetic properties, 51*A*.
sheets, effect of width, 19*A*.
COLD-ROLLING MILLS, 20*A*.
COLD-WORK :
effect on steel, 26*A*., 243*A*.
effect on steel, tensile properties, 341*P*.
effect on strip, 387*P*.
COLD-WORKED STEEL, annealing, 26*A*.
COLLIERIES, use of alloy steel, 302*A*.
COLLIN COKE OVEN, 8*A*.
COLVILLES, LTD., blast-furnace plant, 206*A*.
COMBUSTION :
coal, effect of inorganic compounds, 5*A*., 203*A*.
flame, long and short for industrial heating, 22*A*.
COMBUSTION CHAMBERS, temperature uniformity, 80*A*.
COMBUSTION RATES, in fuel beds, 80*A*.
COMPOSITE STEEL :
flame cutting, 30*A*.
manufacture, 291*A*.
COMPRESSED IRON, structure, 60*A*.
COMPRESSIVE STRENGTH, moulding sand, 145*A*.
CONCENTRATION, iron ore in Lorraine, 77*A*.
CONCRETE, deterioration in sea water, 67*A*.
CONDUCTIVITY :
thermal, alloy steel, 363*A*.
thermal, iron and steel, 364*A*.
thermal, quenching oils, determination, 355*A*.
CONDUIT BOXES, specification, British, 369*A*.
CONTINENTAL STEEL CORPORATION, rolling-mill plant, 96*A*.
CONTRACTION, cast iron, 54*A*.
CONTROL :
fuel, iron and steel works, 5*A*.
gas distribution, 140*A*.
gas temperatures, 6*A*.
normalising furnaces, 162*A*.
open-hearth slag, 89*A*.
steel manufacture, 147*A*., 149*A*., 274*A*.
temperatures, open-hearth furnaces, 319*A*.
CONTROL INSTRUMENTS :
for blast-furnaces, 142*A*.
for rolling mills, 158*A*.
CONVERTERS :
use of chrome-magnesite bricks, 136*A*.
use of magnesite bricks, 136*A*.
use of silica bricks, 136*A*.
CONVEYING SYSTEMS, foundries, 15*A*., 146*A*., 270*A*., 271*A*.
COOLING CURVES :
interpretation, 147*P*.
steel, 537*P*., 373*A*.
COOLING PITS for castings, 272*A*.
COOLING RATE :
carbon steel, effect of carbon, 191*A*.
cast steel, effect on structure, 191*A*.
effect on vanadium steel, 64*A*.
iron-carbon alloys, effect of carbon, 191*A*.
COOLING VELOCITIES, effect on properties of material, 356*A*.
COPPER :
brittleness at low temperatures, 300*A*.
determination in iron and steel, 128*A*., 248*A*.
determination in steel, spectrum analysis, 224*P*., 225*P*.
effect in aluminium-nickel steel, 179*A*.
effect in cast iron, 116*A*., 236*A*.
effect in iron-aluminium-nickel alloys, magnetic properties, 178*A*.
effect in steel, hydrogen attack, 126*A*.
electrodeposition, 66*A*.
rolling, effect of reduction, direction of rolling and roll diameter, 155*A*.
COPPER-CLAD STEEL WIRE, manufacture, 153*A*.
COPPER COATINGS, adherence, 35*A*.
COPPER-MANGANESE STEEL, welded, fatigue and impact tests, 43*A*.
COPPER-MOLYBDENUM STEEL, creep limit, 44*A*.
COPPER-NICKEL ALLOYS, use for valves, 185*A*.
COPPER-NICKEL STEEL, welded, fatigue and impact tests, 43*A*.
COPPER-NICKEL-TIN ALLOYS, for coatings on steel, 301*A*.
CORES :
drying, 145*A*., 271*A*.
permeability and strength, effect of moisture, 145*A*., 271*A*.
CORROSION :
boilers, 68*A*.
boilers, by combustion products, 127*A*.
cast iron in gases, 245*A*.

CORROSION (*contd.*)—
chromium-manganese steel, 67*A*.
chromium-nickel steel in water, 246*A*.
effect on fatigue test, 177*A*.
effect on steel, fatigue strength, 43*A*, 231*A*.
electrochemical theory, 43*A*.
frettage, metals, 377*A*.
galvanised coatings, 170*A*.
gas meters, 309*A*.
iron in acids, 127*A*.
metals, effect of electrolytes, 195*A*.
metals, effect of treatment of waters, 68*A*.
metals, in oil refineries, 376*A*.
metals, in salt solutions and natural waters, 125*A*.
metals, in soap industries, 246*A*.
metals in wine industry, 245*A*.
nitrided manganese steel, 67*A*.
nitrogen-bearing chromium steel, 132*P*.
phosphorus steel, 194*A*.
pipes, in mine water, 309*A*.
pipes in soil, 245*A*., 309*A*.
pipes in soil, effect of soil properties, 69*A*.
steel in acids, effect of organic substances, 196*A*.
steel, effect of carbon, 194*A*.
steel by nitrates, 127*A*.
steel, in sea water, 67*A*.
steel, in sulphur-bearing gases, 195*A*.
steel in water, 195*A*.
wire rope, 69*A*.
zinc coatings, 292*A*.
CORROSION FATIGUE :
metals, 579*P*., 595*P*.
steel, 111*A*., 377*A*.
CORROSION RESISTANCE :
nickel cast iron, 301*A*.
welded joints, 287*A*.
CORROSION-RESISTANT ALLOYS, properties, 66*A*.
CORROSION-RESISTANT STEEL :
development, 183*A*.
properties, 365*A*.
CORROSION TESTS, 194*A*., 196*A*.
Dupont and Huey, 196*A*.
painted steel, 40*A*.
protective coatings, 196*A*.
Strauss copper sulphate test, 196*A*.
CORRUGATION, rails, 240*A*.
COTTAM, EDWIN, & CO., LTD., rolling-mill plant, 351*A*.
COUNCIL REPORT, 39*P*.
CRACKING, intercrystalline, boiler plates, 231*A*., 376*A*.
CRACKS :
in chilled rolls, 210*A*.
in chromium-nickel steel castings, 61*A*.
hair-line, in steel, 150*A*., 346*A*.
in welds, 286*A*.
CRANES for steel mills, 21*A*.
CRANKSHAFTS :
automobile, manufacture, 24*A*.
failure, 175*A*.
surface hardening, 224*A*.
CREEP :
alloy steel, 299*A*.
carbon steel, 45*A*.
metals, determination, 299*A*.
metals, under static and repeated stresses, 46*A*.
pipe flanges, 180*A*.
steel, effect of manufacturing variables, 44*A*.
structural members, 114*A*.
tubular members, subjected to internal pressure, 45*A*.
CREEP LIMIT :
chromium - copper - molybdenum steel, 44*A*.
copper-molybdenum steel, 44*A*.
determination, 44*A*., 235*A*.
CREEP STRENGTH, relation to specific gravity and microstructure, 299*A*.
CREEP TESTS, evaluation of results, 298*A*.
CROMODISING, 66*A*.
CRYSTALS :
metal, plastic flow, 295*A*.
metal, properties, 60*A*.
metal, work hardening, 60*A*.
plasticity, 41*A*.
single, moment of rotation in magnetic field, 60*A*.
single, orientation, 60*A*.
CUPOLA LININGS :
effect of variations in operation, 269*A*.
refractory mortars, 2*A*.
silica refractories, 79*A*.
CUPOLA PRACTICE, 13*A*., 270*A*., 338*A*.
CUPOLAS :
design, 270*A*.
effect of blast pressure, 269*A*.
mechanical charging, 146*A*.
reactions, 338*A*.
relation between coke consumption and flue gas composition, 269*A*.
use of manganese ore, 84*A*.
CUPPING TESTS :
Erichsen method, 44*A*.
Olsen method, 44*A*.

CURTIN HOWE CORPORATION, coating process, 290*A*.
CUTTING :
flame, composite steel, 30*A*.
oxy-acetylene, effect on structural steel, 105*A*.
oxy-acetylene, for removal of risers from castings, 106*A*.
oxy-acetylene, steel, 357*A*.
CUTTING FLUIDS :
effect on machining operation, 31*A*.
function, 31*A*.
selection for machine tools, 31*A*.
CUTTING MACHINES, oxy-acetylene, 106*A*.
CUTTING SPEED, relation to tool life, 107*A*.
CUTTING TEMPERATURE, tools, as indication of machinability, 288*A*.
CYANIDING :
Armco iron, 282*A*.
dry-, steel, 225*A*.
high-speed steel, 282*A*.
steel, 281*A*.
CYCLONE ANNEALING FURNACE, 283*A*.
CYLINDER BLOCKS, automobile, wear, 177*A*.
CYLINDERS :
air-compressor, moulding, 271*A*.
automobile, wear, 112*A*.
Diesel engine, wear, 297*A*.
engine, cast iron for, 115*A*.
vacuum, moulding, 146*A*.
CZECHOSLOVAKIA, mineral resources, 199*A*.

DAMPING :
determination, 48*A*.
magnetic materials, relation to elasticity modulus, 113*A*.
DAMPING CAPACITY :
cast iron, 54*A*., 237*A*.
structural steel, 304*A*.
DAVY AND UNITED ROLL FOUNDRY, LTD., plant, 339*A*.
DECARBURISATION :
effect on wire, fatigue strength, 48*A*.
steel, 24*A*., 100*A*.
steel, bibliography, 100*A*.
DEEP DRAWING :
hot and cold strip, 92*A*.
metals, 219*A*.
power requirements, 219*A*.
DEEP-DRAWING STEEL, manufacture, 212*A*.
DEFECTS :
in cold-rolled strip, 97*A*.
connection between those in blooms and those in subsequent tubes, 21*A*.
iron castings, 86*A*.
removal from blooms by flame scarfing, Lin-De-Surfacer machine, 21*A*.
removal from ingots, 87*A*.
in rolled steel, 150*A*.
in rolls, 13*A*.
in steel, 43*A*., 195*A*.
DEFORMATION :
material in rolling, 277*A*.
rate of, effect on yield stress of metals at high temperatures, 115*A*.
DEFORMATION BANDS, formation, 295*A*.
DEGREASING, steel, 168*A*.
DELTA REGION :
carbon steel, 373*A*.
iron-nickel system, 567*P*., 583*P*., 374*A*.
DENSITY, metals and alloys, 146*A*.
DEOXIDATION, basic Bessemer steel, with pig iron, 88*A*.
DESCALING, steel, 289*A*.
DESULPHURISATION :
iron, 257*P*., 82*A*., 265*A*.
iron, with burnt lime in Stürzelberg furnace, 143*A*.
iron, Saniter process, 261*P*.
iron, soda-ash method, 10*A*., 11*A*., 209*A*., 337*A*.
iron, sodium carbide method, 337*A*.
iron, sodium chloride method, 337*A*.
DIE STEEL, chromium-manganese, heat treatment, dimensional changes, 102*A*.
DIES :
forging, design, 151*A*.
forging, production, 218*A*.
forging, welding, 357*A*.
stamping, steels for, 219*A*.
wire drawing, conical and curved, 93*A*.
DIESEL ENGINES, wear of cylinders, 297*A*.
DIFFUSION, gases in metals, 180*A*.
DINSLAKEN, strip mills, 96*A*.
DIRECT PROCESS of steel manufacture, surface reaction method, 274*A*.
DIRECT PRODUCTION, iron, 267*A*.
DISTILLATION, coal, low-temperature, 139*A*.
DOLOMITE BRICKS. *See* Refractory Materials.

DONETZ BASIN, coal deposits, 76*A*.
DORMAN, LONG & CO., LTD. :
rolling-mill plant, 20*A*.
steel plant, 16*A*.
DRAWING :
aluminium-chromium-silicon steel, 43*A*.
high-speed steel wire, 94*A*.
tungsten steel, 101*A*.
wire, conical and curved dies, 93*A*.
wire, French methods, 153*A*., 154*A*.
wire, fundamentals, 93*A*.
wire, history, 93*A*., 154*A*.
wire, Statabloc machine, 276*A*.
wire, stresses during, 93*A*.
wire, Stringfellow reactive block, 276*A*.
wire, triangular cross-section, 153*A*.
DRAWN STEEL, heat treatment, 25*A*.
DROP FORGING, 92*A*., 347*A*.
behaviour of steel and light metals, 152*A*.
power requirements and flow of materials, 217*A*.
DRUMS :
mild steel, specification, British, 369*A*.
steel, specification, British, 57*A*.
DRYING, cores, 145*A*., 271*A*.
DUFAY PROCESS of colour photography, 370*A*.
DUPLEX PROCESS, for malleable cast iron, 14*A*.
DUPONT AND HUEY CORROSION TEST, 196*A*.
DURALUMIN, brittleness at low temperatures, 300*A*.
DURASPRAY PROCESS, 292*A*.
DURVILLE PROCESS for casting ingots, 297 *Paper*.
DYNAMO STEEL, effect of phosphorus and arsenic, 181*A*.

EDWARDS, E. H., CO., wire-drawing plant, 276*A*.
ELASTIC LIMIT, torsional, alloy steel, 359*A*.
ELASTIC PROPERTIES, cast iron, 359*A*.
ELASTICITY MODULUS, magnetic materials, relation to damping, 113*A*.
ELASTICITY TESTS, cast iron, 109*A*.
ELDRED PROCESS, for rolling liquid metals, 222*A*.
ELECTRIC CURRENTS :
high-frequency, effect on steel, 555*P*., 576*P*., 590*P*., 362*A*.
high-frequency, use for heat treatment, 23*A*., 160*A*., 225*A*.
ELECTRIC CURRENTS (*contd.*)—
use for hardening, Vologdin method, 282*A*.
ELECTRIC DRIVING :
rolling mills, 97*A*., 157*A*., 278*A*., 279*A*., 351*A*.
tube mills, 20*A*.
ELECTRIC-FURNACE PRACTICE :
American, 496*P*.
European, 496*P*.
Zaporozhstal' Works, 213*A*.
ELECTRIC FURNACES, 16*A*.
arc, 87*A*., 89*A*.
arc, melting of alloy-steel scrap, 17*A*.
for brass, 14*A*.
control of electrodes, 213*A*.
Héroult, effect of age on heat losses, 212*A*.
Héroult, power consumption, 90*A*.
high frequency, 149*A*., 213*A*.
induction, for research work, 149*A*.
manufacture of tool steel, 89*A*.
method of using carbon electrodes, 90*A*.
plastic refractory for lining, 3*A*.
reduction of iron ore, 268*A*.
use of alumina bricks, 263*A*.
use for brazing, 165*A*.
use of chrome-magnesite bricks, 136*A*., 263*A*.
use of magnesite bricks, 136*A*.
use of molybdenum and tungsten for resistances, 239*A*.
use of silica bricks, 136*A*., 263*A*.
use of sillimanite bricks, 136*A*., 263*A*.
for zinc melting, 14*A*.
ELECTRIC STEEL, acid compared with basic, 90*A*.
ELECTRICAL EQUIPMENT, use of nickel alloys for, 117*A*., 118*A*.
ELECTRICAL INDUSTRIES, use of nickel alloys, 302*A*.
ELECTRICAL PROPERTIES :
aluminium-manganese steel, 53*A*.
iron-nickel alloys, 298*A*.
ELECTRICAL RESISTANCE :
alloy steel, 363*A*.
iron-silicon alloys, 362*A*.
ELECTRICAL RESISTANCE/TEMPERATURE CURVES, iron and steel, 435 *Paper*.
ELECTRICAL SHEETS, rotational hysteresis loss, 50*A*.
ELECTRICAL TESTS, 120*A*.
ELECTRODEPOSITED COATINGS, standardisation, 290*A*.
ELECTRODEPOSITION :
brass, 66*A*.

ELECTRODEPOSITION (*contd.*)—
cadmium, 66*A*., 290*A*.
chromium, 66*A*.
chromium, from trivalent salt solutions, 36*A*.
copper, 66*A*.
dipping baskets for, 169*A*.
gold, 66*A*.
iron, 66*A*.
lead, 66*A*.
nickel, 66*A*.
nickel and chromium on tinplate, 35*A*., 171*A*.
nickel, solution standards, 35*A*.
nickel, use of activated carbon, 290*A*.
nickel, use of nickel sulphate, 36*A*.
silver, 66*A*.
tin, 170*A*.
tin, from acid sulphate solutions, 171*A*.
zinc, 66*A*., 170*A*., 292*A*.
ELECTRODES :
carbon, use in electric furnaces, 90*A*.
control in electric furnaces, 213*A*.
for resistance welding, 104*A*.
welding, development, 164*A*.
ELECTRO-GALVANISING 170*A*., 292*A*.
ELECTROLYTES, effect on atmospheric corrosion, 195*A*.
ELECTRON DIFFRACTION CAMERA, Finch, 121*A*., 370*A*.
ELECTRON-DIFFRACTION STUDY, oxide films, 574*P*., 589*P*., 371*A*.
ELECTRON MICROSCOPE, 187*A*.
ELECTROPLATING, control, 35*A*.
ELECTROPLATING INDUSTRY, use of wire wheels, 33*A*.
ELECTROPLATING PLANTS, continuous, 290*A*.
ELEKTROSTAL WORKS, plant, 149*A*.
ELONGATION, steel, effect of speed of stretching and rate of loading, 230*A*.
EMBRITTLEMENT :
boiler plates, 516*P*.
steel, 513*P*., 515*P*.
EMMEL PROCESS for manufacture of high-duty cast iron, 338*A*.
ENAMELLING :
cast iron, 293*A*.
steel, 293*A*.
vitreous, control, 38*A*., 172*A*., 293*A*.
ENAMELLING FURNACES :
conveyor equipment lubrication, 223*A*.
electric, 293*A*.
ENAMELLING INDUSTRY, use of sand blasting, 39*A*.
ENAMELS, preparation, 39*A*.
ENDURON, properties, 209*A*.
ENGINE PARTS, heat treatment, 223*A*.
ENGINES :
Diesel, wear of cylinders, 297*A*.
internal-combustion, cast iron for, 115*A*.
internal-combustion, chromium-nickel steel for, 302*A*.
internal-combustion, nickel cast iron for, 301*A*.
internal-combustion, nickel steel for, 302*A*.
marine, chromium-nickel steel for, 302*A*.
marine, nickel steel for, 302*A*.
EQUILIBRIA, heterogeneous, "lever relationship," 243*A*.
ERICHSEN CUPPING TEST, 44*A*.
EROSION :
gun barrels, 69*A*.
iron and steel, 125*A*.
marine propellers, 126*A*.
metals, 247*A*.
ETCHING, heat-resistant steel, 241*A*.
EVANS PROCESS of rolling liquid metals, 222*A*.
EWING EXTENSOMETER, 294*A*.
EXPANSION :
cast iron, 54*A*.
thermal, alloy steel, 363*A*.
thermal, chromium-nickel steel, 117*A*.
thermal, iron-nickel alloys, 179*A*.
thermal, nickel steel, 303*A*.
thermal, refractory materials, 2*A*.
thermal, refractory materials, bibliography, 2*A*.
EXTENSOMETERS :
Ewing, 294*A*.
Huggenberger, 294*A*.
Lindley, 294*A*.

FACINGS, foundry, 85*A*.
FAILURE :
boiler plates, 175*A*.
boiler tubes, 175*A*.
crankshafts, 175*A*.
FATIGUE :
chromium - molybdenum - nickel steel at high temperatures, 47*A*.
chromium-nickel steel at high temperatures, 47*A*.
corrosion-, metals, 579*P*., 595*P*.
corrosion-, steel, 111*A*., 377*A*.
metals, 111*A*., 176*A*.

FATIGUE (*contd.*)—
nitrided parts, 100*A*.
roller bearings, 112*A*.
steel, 111*A*.
steel, changes in crystal structure, 47*A*., 295*A*.
tyre steel, 47*A*.
welded joints, 42*A*.
welded rails, 167*A*.
FATIGUE FAILURE from stress cycles of varying amplitude, 112*A*.
FATIQUE STRENGTH :
bend, welded chromium-molybdenum steel tubes, 227*A*.
bend, welds, 167*A*.
chromium-molybdenum steel, effect of shape and structure of specimen, 176*A*.
effect of corrosion, 177*A*.
effect of manufacturing methods, 177*A*.
effect of notches, 295*A*.
steel, effect of corrosion, 43*A*.
steel, effect of corrosion and abrupt changes in section, 231*A*.
tensile, welded joints, 228*A*.
wire, effect of decarburisation, 48*A*.
FATIGUE TESTING MACHINES, 175*A*.
Torsator, 360*A*.
FATIGUE TESTS, effect of notches and shape of specimen, 177*A*.
FERRIC OXIDE, determination in slag, 128*A*.
FERRITE SPOTS, in steel, 242*A*.
FERRO MACHINE AND FOUNDRY CO., plant, 146*A*.
FERRO-SILICO-ZIRCONIUM, manufacture, 267*A*.
FERRO-SILICON, effect in cast iron, 115*A*.
FERRO-TITANIUM, effect in cast iron, 115*A*.
FERRO-VANADIUM, manufacture from vanadium-bearing slag, 142*A*.
FERRON, 289*A*.
FERROTHERM STEEL, properties, 119*A*.
FERROUS OXIDE :
determination in slag, 128*A*.
in steel, dependency on basicity of slag, 212*A*.
FF ALLOYS, properties, 119*A*.
FILMS :
oxide, determination of oxygen, 630*P*., 378*A*.
oxide, electron-diffraction study, 574*P*., 589*P*, 371*A*.
oxide, on steel, 188*A*.
FINCH ELECTRON DIFFRACTION CAMERA, 121*A*., 370*A*.
FINKEY-BAMERT COAL CLEANING SYSTEM, 204*A*.
FIREBRICKS. *See* Refractory Materials.
FIRECLAY. *See* Refractory Materials.
FIRTH, THOS., & JOHN BROWN, LTD., history and development, 87*A*.
FIRTH-BROWN INCLUSION COUNT METHOD, 371*A*.
FIRTH HARDOMETER, 49*A*.
FISCHER-TROPSCH HYDROGENATION PROCESS, 9*A*.
FISSURES, in rails, 175*A*.
FLAME-HARDENING :
applications, 100*A*.
manganese-molybdenum steel, 26*A*.
molybdenum steel, 26*A*.
principles, 27*A*.
FLAME SCARFING, blooms, Lin-De-Surfacer machine, 21*A*.
FLAMES :
long and short, for industrial heating, 22*A*.
temperature measurement, 98*A*.
FLOTATION, iron ore, 337*A*.
FLOW :
materials in drop forging, 217*A*.
plastic, metal crystals, 295*A*.
FLUE DUST, treatment of pig iron, 10*A*.
FLUE GAS, composition, relation to coke consumption in cupolas, 269*A*.
FLUIDITY :
cast-iron, effect of soda ash, 209*A*.
liquid metals, 15*A*.
FLUORSPAR, effect in basic open-hearth process, 257 *Paper*.
FLUX INCLUSIONS in tin coatings, 171*A*.
FOOTNERS PICKLING PROCESS, 39*A*.
FORD MOTOR CO., centrifugal casting of gear blanks, 85*A*.
FORD MOTOR COMPANY OF CANADA, LTD., foundry plant, 211*A*.
FORGING :
aircraft parts, 347*A*.
alloy steel, 151*A*.
automobile tie-rods, 151*A*.
drop, 92*A*., 347*A*.
drop, behaviour of steel and light metals, 152*A*.
drop, power requirements and flow of materials, 217*A*.
nitrogen-bearing chromium steel, 109*P*.
rolls, 151*A*.
suitability of metals, 217*A*.
tool steel ingots, 218*A*.

FORGING DIES :
design, 151*A*.
production, 218*A*.
welding, 357*A*.
FORGING HAMMERS, 151*A*.
FORGING MACHINES, German, 217*A*.
FORGING PLANT :
William Beardmore & Co., Ltd., 347*A*.
Bethlehem Steel Co., 218*A*.
FORGING PRACTICE, 92*A*., 151*A*., 217*A*., 276*A*., 347*A*.
FORGINGS :
handling and machining, 87*A*.
heating, 151*A*.
large, manufacture, 92*A*.
FORSTERITE. *See* Refractory Materials.
FOUNDRIES :
accidents, 272*A*., 341*A*.
budgetary control and standard costs, 13*A*.
conveying systems, 15*A*., 146*A*., 270*A*., 271*A*.
co-operation with Drawing Office and Machine Shop, 209*A*.
mechanised, 87*A*.
recovery of iron from sweepings, 13*A*.
use of probability tables, 211*A*.
FOUNDRY FACINGS, 85*A*.
FOUNDRY FURNACES, rotary, pulverised-coal fired, 338*A*.
FOUNDRY PLANT :
C. Akrill & Co., Ltd., 210*A*.
Albion Malleable Iron Co., 14*A*.
Davy and United Roll Foundry, Ltd., 339*A*.
Ferro Machine and Foundry Co., 146*A*.
Ford Motor Co. of Canada, Ltd., 211*A*.
General Motors Corp., 146*A*.
Key Co., 340*A*.
Lenmetallurgstroy Works, 14*A*.
McKinnon Industries, Ltd., 340*A*.
S. Russell & Sons, Ltd., 14*A*.
FOUNDRY PRACTICE, 13*A*., 84*A*., 144*A*., 209*A*., 269*A*., 338*A*.
Germany, 209*A*.
FOX INCLUSION-COUNT METHOD, 371*A*.
FRACTURE :
cast iron, 109*A*.
rails, 46*A*.
wire rope, 47*A*.
FRACTURES, formation in testing, 231*A*.
FRANCE :
coal deposits, 76*A*.
FRANCE (*contd.*)—
wire-drawing practice, 153*A*., 154*A*.
FRETTAGE CORROSION, metals, 377*A*.
FRETZ-MOON PROCESS, welding, 164*A*.
FRIEDRICH PORT for open-hearth furnaces, 319*A*.
FUEL :
control, iron and steel works, 5*A*.
properties and tests, 5*A*., 80*A*., 138*A*., 203*A*., 264*A*., 331*A*.
pulverised. *See* Coal, pulverised.
FURNACE LININGS, special refractories, 136*A*.
FURNACES :
blast. *See* Blast Furnaces.
Brackelsberg, 14*A*.
burners, Gako, 140*A*.
electric. *See* Electric Furnaces.
fuel-fired, design, 138*A*.
glass, temperature measurement, 98*A*.
heat-treatment. *See* Heat-Treatment Furnaces, Annealing Furnaces, &c.
long and short flames for combustion, 22*A*.
oil-fired, 141*A*.
open-hearth. *See* Open-Hearth Furnaces.
pressure-gas firing, 140*A*.
pulverised-coal-fired, 14*A*., 338*A*.
reheating. *See* Reheating Furnaces and Soaking Pits.
temperature uniformity in combustion chambers, 80*A*.
vacuum fusion, for determination of oxygen, 379*A*.
FUSAIN, hydrogenation, 335*A*.

GAKO BURNER, 140*A*.
GALVANISED COATINGS :
corrosion, 170*A*.
thickness determinations, 291*A*.
GALVANISED STEEL, structure, 123*A*.
GALVANISED WIRE, specification, British, 154*A*.
GALVANISING :
effect of aluminium, 170*A*.
electro-, 170*A*., 292*A*.
high speed, 292*A*.
sheets, 38*A*., 169*A*., 291*A*.
small articles, 170*A*., 291*A*.
steel, 37*A*., 170*A*.
strip, 37*A*.
Tainton process, 171*A*.
wire, 170*A*.

GALVANISING FURNACES, heat supply, 37*A*.
GALVANISING PLANT, dimensions and lay-out, 170*A*.
GALVANISING POTS, Williams' device to prevent local heating, 37*A*.
GAS :
  blast-furnace. *See* Blast-Furnace Gas.
  coke oven. *See* Coke-Oven Gas.
  distribution, control, 140*A*.
  non-luminous, radiation, 332*A*.
  temperature measurement, 98*A*.
  temperature measurement, aspirating thermocouples, 98*A*.
  temperature measurement in boilers, 98*A*.
  temperature measurement in chemical industry, 98*A*.
  temperature measurement in glass furnaces, 98*A*.
  town, utilisation, 264*A*.
GAS CONTAINERS, welding, 30*A*.
GAS INDUSTRY, use of Ni-Hard, 236*A*.
GAS METERS, corrosion, 309*A*.
GAS PRODUCERS. *See* Producers.
GAS TEMPERATURES, control, 6*A*.
GASES :
  action on refractory materials, 318*A*.
  corrosion of cast iron, 245*A*.
  determination in iron and steel, fractional vacuum fusion method, 378*A*.
  determination of sulphur dioxide, 249*A*.
  diffusion in metals, 180*A*.
  effect in steel, 180*A*.
  evolved during solidification of rimming steel, 91*A*.
  evolved during solidification of steel, 148*A*.
  evolution in welding, 285*A*.
  flow in blast-furnaces, 337*A*.
  flow in blast-furnaces, effect of lumpiness of charge, 266*A*.
  occluded, in cast iron, 54*A*.
  sulphur-bearing, corrosion of steel, 195*A*.
  sulphur-bearing, effect on chromium-nickel steel, scaling, 282*A*.
  sulphur-bearing and sulphur-free, scaling of steel, 353*A*.
GATING, castings, 85*A*.
GEAR BLANKS :
  castings for, specification, British, 244*A*.
  centrifugal casting, 85*A*.
GEAR TEETH, pitting, 304*A*.
GENERAL MOTORS CORP. :
  foundry plant, 146*A*.
  heat-treatment practice, 159*A*.
GERMANY :
  automobile steels, 160*A*.
  coal deposits, 199*A*.
  coal-cleaning developments, 203*A*.
  forging machines, 217*A*.
  fracture of rails, 46*A*.
  galvanising practice, 170*A*.
  graphite deposits, 199*A*.
  iron industry, 83*A*.
  rolling-mill design, 95*A*.
  strip mill at Dinslaken, 96*A*.
GILLETTE INDUSTRIES, LTD., manufacture of razor blades, 101*A*.
GIRBOTOL PROCESS for sulphur recovery from coke-oven gas, 140*A*.
GLASS FURNACES, temperature measurement, 98*A*.
GOLD, electrodeposition, 66*A*.
GRAIN SIZE :
  in chromium steel, 123*A*.
  determination, 187*A*., 188*A*.
  effect in alloy steel, 123*A*.
  effect in carbon steel, 185*A*.
  effect in chromium-nickel steel, 62*A*.
  effect on refractory bricks, porosity, 78*A*.
  effect in tool steel, 49*A*., 62*A*.
  in high-speed steel, 188*A*.
  McQuaid-Ehn Test, 243*A*.
  nitrogen-bearing chromium steel, effect on heat treatment, 131*P*.
  steel, relation to inclusions, 242*A*.
  in tool steel, 188*A*.
GRAINS :
  austenite, effect on steel, 372*A*.
  primary stability, 372*A*.
GRAPHITE :
  colloidal, use for lubrication, 223*A*.
  solution rate in cast iron, 306*A*.
GRAPHITE DEPOSITS, Sudetenland, 199*A*.
GRAPHITISATION :
  cast iron, 61*A*., 116*A*., 122*A*.
  cast iron, effect of elements, 180*A*.
GREAT LAKES STEEL CORP. :
  pickling plant, 168*A*.
  plant, 87*A*.
GRINDING :
  rolls, 349*A*.
  strip, 158*A*.
GRINDING MACHINERY :
  for coal, 203*A*.
  synthetic bonded wheels, 87*A*.
GROWTH, cast iron, 46*A*., 182*A*., 236*A*.

GUEST KEEN BALDWINS IRON & STEEL CO., LTD., rolling-mill plant, 351*A*.
GUEST KEEN AND NETTLEFOLDS, LTD., strip mills, 96*A*.
GUN BARRELS, erosion, 69*A*.
GUTEHOFFNUNGSHÜTTE, coking plant, 205*A*.
GUTMADINGEN ORE, smelting, 142*A*.

HAIR-LINE CRACKS in steel, 150*A*., 346*A*.
HAMMERS, pneumatic, steels for, 57*A*.
HARDENABILITY, steel, 296*A*.
HARDENING :
flame, 100*A*., 225*A*.
flame, manganese-molybdenum steel, 26*A*.
flame, molybdenum steel, 26*A*.
flame, principles, 27*A*.
steel, 101*A*.
strain-age, mild steel, 341 *Paper*.
surface, camshafts, 224*A*.
surface, cast iron, 159*A*.
surface, crankshafts, 224*A*.
surface, malleable cast iron, 159*A*.
surface, " Ni-Carb " process, 225*A*.
surface, Shorter process, 224*A*.
surface, use of electric currents, Vologdin method, 282*A*.
surface, use of oxy-acetylene flame, 224*A*.
temper, steel, 283*A*.
work-, metal crystals, 60*A*.
HARDNESS :
cast iron, 116*A*.
chromium steel, effect of annealing, 296*A*.
iron-copper-molybdenum alloys, 296*A*.
metals, 177*A*.
variation in heat-treated parts, 232*A*.
welded joints, 42*A*.
welds, in relation to thermal disturbances, 104*A*.
HARDNESS TESTING MACHINES, 294*A*., 295*A*.
Firth-Hardometer, 49*A*.
Herbert, 49*A*.
Rockwell, 49*A*., 177*A*.
sclerometer, 49*A*.
Shore scleroscope, 177*A*.
Vickers, 49*A*.
HARDNESS TESTS, history, 48*A*.
HAZELETT PROCESS for rolling liquid metals, 222*A*.

HEAT :
evolution during transformation in steel, 537*P*.
specific, alloy steel, 363*A*.
specific, quenching oils, determination, 355*A*.
specific, steel, 557*P*.
total, alloy steel, 363*A*.
waste, recovery from open-hearth furnaces, 87*A*., 88*A*.
HEAT RESISTANCE :
iron-chromium-nickel alloys, 183*A*.
nitrogen-bearing chromium steel, 131*P*.
HEAT-RESISTANT STEEL :
ageing, 49*A*.
brittleness at high temperatures, 299*A*.
development, 183*A*.
development in Russia, 184*A*.
etching, 241*A*.
properties, 117*A*., 365*A*.
HEAT TRANSFER, 6*A*., 203*A*.
HEAT TREATED PARTS, hardness variation, 232*A*.
HEAT TREATMENT, 22*A*., 100*A*., 159*A*., 223*A*., 281*A*., 353*A*.
alloy steel, 161*A*.
automobile parts, 159*A*., 160*A*.
chromium-manganese die steel, dimensional changes, 102*A*.
chromium-nickel cast iron, 160*A*.
chromium-silicon steel, 161*A*.
cold-drawn steel, 101*A*.
deformation-resistant steel, 354*A*.
drawn steel, 25*A*.
effect on cold-rolled sheets, 62*A*.
effect on nitrogen-bearing chromium steel, 99 *Paper*.
effect on nitrogen-bearing chromium steel, grain size, 131*P*.
engine parts, 223*A*.
nickel-silicon steel, 161*A*.
piston rings, 24*A*.
pressure vessels, 354*A*.
spring steel, 160*A*.
springs, 24*A*.
tool steel, 223*A*.
tungsten steel, 101*A*.
use of electric currents, 23*A*., 160*A*., 225*A*.
use of salt baths, 23*A*., 224*A*.
use of salt baths, electrode, 162*A*.
washers, 354*A*.
HEAT-TREATMENT FURNACES, 24*A*.
" Char-Mo," 223*A*.
controlled atmospheres, 22*A*., 23*A*., 100*A*.
electric, 102*A*.
forced-convection type, 22*A*., 354*A*.

HEAT-TREATMENT FURNACES (*contd.*)–
gas-fired, 101*A*.
for rolls, 3*A*.
HEATING CURVES :
interpretation, 147*P*.
steel, 373*A*.
HERBERT HARDNESS TESTER, 49*A*.
HÉROULT FURNACES :
effect of age on heat losses, 212*A*.
power consumption, 90*A*.
HIGH-SPEED STEEL :
austenite transformation, 192*A*.
chromium-tungsten-vanadium, properties, 186*A*.
cyaniding, 282*A*.
grain size, 188*A*.
heating and cooling curves, 373*A*.
HIGH-SPEED STEEL WIRE, drawing, 94*A*.
HINRICHSEN PROCESS of nickel plating, 36*A*.
HISTORY :
hardness tests, 48*A*.
iron, 268*A*.
iron founding in England, 83*A*.
iron-making in Hungary, 208*A*.
iron-making in Yorkshire, 83*A*.
Wilsontown, 337*A*.
wire drawing, 93*A*., 154*A*.
HOLLAND, coal-cleaning developments, 203*A*.
HOT BLAST STOVES. *See* Blast-Furnace Stoves.
HUGGENBERGER, extensometer, 294*A*.
HUNGARY, history of iron making, 208*A*.
HYDROGEN :
absorption by pure iron, 54*A*.
attack on steel, effect of elements, 126*A*., 196*A*.
determination in iron and steel, 248*A*.
determination in iron and steel, vacuum fusion method, 378*A*.
effect on steel, 196*A*.
reaction with carbon in iron, 189*A*., 306*A*.
reduction of iron ore under pressure, 207*A*.
HYDROGENATION :
coal, 335*A*.
coal, Fischer-Tropsch process, 9*A*.

IGNITION POINT :
anthracite, 331*A*.
coal, 331*A*.
IMPACT-TENSILE TESTS, 110*A*.
IMPACT-TESTING MACHINE, repeated, 174*A*.
IMPACT TESTS, 230*A*.
carbon steel, 173*A*.
cast iron, 109*A*.
notched-bar, interpretation, 173*A*.
welded joints, 42*A*.
welded joints, bibliography, 42*A*.
INCLUSIONS :
in cast iron, 189*A*., 242*A*.
counting methods, Firth-Brown, 371*A*.
counting methods, Fox, 371*A*.
determination in iron and steel, alcoholic iodine method, 381*A*., 382*A*.
determination in iron and steel, aqueous iodine method, 380*A*., 382*A*.
determination in iron and steel, chlorine method, 380*A*., 382*A*.
diagram for counting, 187*A*.
flux, in tin coatings, 171*A*.
slag, effect of working conditions in acid open-hearth practice, 287 *Paper*.
in steel, 180*A*., 235*A*.
in steel, bibliography, 180*A*.
in steel, relation to grain size, 242*A*.
INCLUSIONS COUNT SUB-COMMITTEE, report, 371*A*.
INDIA :
coking plants, 264*A*.
iron ore deposits, 316*A*.
INGOT COMMITTEE, Eighth Report. *Summary*, 599*P*. *Discussion*, 601*P*. *Correspondence*, 628*P*. *Committee's Reply*, 641*P*.
INGOT MOULDS :
cracking, 633*P*., 639*P*., 344*A*.
life, 636*P*.
for non-ferrous metals, 339*A*.
properties, 646*P*.
properties and life, 91*A*.
stresses, 638*P*.
temperature distribution, 632*P*.
temperature gradients, determination, 344*A*.
temperature gradients, determination, bibliography, 344*A*.
INGOT MOULDS SUB-COMMITTEE, Second Report, 344*A*.
INGOTS :
alloy-steel, uncooled, annealing, 25*A*.
casting, Durville process, 297 *Paper*.
piping, 215*A*.
removal of defects, 87*A*.
rimming steel, gas evolution, 91*A*.
rimming steel, solidification, 91*A*., 149*A*.

INGOTS (*contd.*)—
rimming steel, solidification and structure, 214*A*.
rimming steel, solidification and structure, bibliography, 215*A*.
segregation, 601*P*., 628*P*., 641*P*.
slow cooling, use of insulating material, 315 *Paper*.
tool steel, forging, 218*A*.
INLAND STEEL Co., strip mills, 20*A*.
INSTITUT FÜR CHEMISCHE TECHNOLOGIE ANORGANISCHER STOFFE, research laboratories, 41*A*.
INSULATING BRICKS :
hot-face, 79*A*.
properties, 318*A*.
INSULATING MATERIAL, for slow-cooling of ingots, 315 *Paper*.
INSULATION, open-hearth furnaces, 483*P*., 5*A*., 263*A*., 319*A*.
INVERSE-RATE CURVES, steel, 537*P*.
IRAQ, coal deposits, 76*A*.
IRON :
cavitation, 125*A*.
compressed, structure, 60*A*.
corrosion in acids, 127*A*.
corrosion, effect of electrolytes, 195*A*.
desulphurisation, 257*P*., 82*A*., 265*A*.
desulphurisation with burnt lime in Stürzelberg furnace, 143*A*.
desulphurisation, Saniter process, 261*P*.
desulphurisation, soda ash method, 10*A*., 11*A*., 209*A*., 337*A*.
desulphurisation, sodium carbide method, 337*A*.
desulphurisation, sodium chloride method, 337*A*.
determination in presence of vanadium, 248*A*.
determination in slag, 128*A*.
direct production, 267*A*.
effect of titanium, 367*A*.
electrodeposition, 66*A*.
history, 268*A*.
magnetic permeability, measurement, 50*A*.
meteoric, Widmannstätten structure, 372*A*.
molten, temperature measurement, 98*A*., 280*A*., 352*A*.
oxide films, electron diffraction study, 371*A*.
powder metallurgy, 119*A*.
production, 10*A*., 82*A*., 142*A*., 206*A*., 265*A*., 336*A*.
IRON (*contd.*)—
pure, absorption of hydrogen and nitrogen, 54*A*.
pure, electrical resistance/temperature curves, 435 *Paper*.
reaction between hydrogen and carbon, 189*A*., 306*A*.
recovery from foundry sweepings, 13*A*.
spectroscopically pure, 384*A*.
structure after drawing, swaging and elongating in tension, 294*A*.
thermal conductivity, 364*A*.
transformer, magnetic properties, 112*A*.
IRON-ALUMINIUM ALLOYS, vacuum melting, 53*A*.
IRON - ALUMINIUM - COBALT - NICKEL ALLOYS, magnetic properties, 202*P*.
IRON - ALUMINIUM - COPPER - NICKEL ALLOYS, magnetic properties, 199*P*.
IRON-ALUMINIUM-NICKEL ALLOYS :
magnetic properties, 187 *Paper*, 113*A*., 362*A*.
magnetic properties, effect of ageing, 296*A*.
magnetic properties, effect of elements, 178*A*.
magnetic properties, effect of titanium and molybdenum, 52*A*.
IRON-ALUMINIUM-SILICON ALLOYS, magnetic properties, 112*A*.
IRON-CARBON ALLOYS, cooling rate, effect of carbon, 191*A*.
IRON-CARBON DIAGRAM, 65*A*., 243*A*.
IRON-CHROMIUM-NICKEL ALLOYS :
brittleness after long-time annealing, 307*A*.
effect of molybdenum, 67*A*.
heat resistance, 183*A*.
magnetic properties, 308*A*.
properties, 184*A*.
use for valves, 185*A*.
IRON-CHROMIUM-NICKEL DIAGRAM, 307*A*.
IRON-CHROMIUM-PHOSPHORUS SYSTEM, 308*A*.
IRON-COBALT ALLOYS, transformations, 577*P*., 592*P*., 374*A*.
IRON-COBALT-NICKEL ALLOYS, transformations, 243*A*.
IRON-COPPER-MOLYBDENUM ALLOYS :
hardness, 296*A*.
magnetic properties, 296*A*.
IRON - COPPER - MOLYBDENUM - DIAGRAM, 244*A*.

IRON-COPPER-NICKEL ALLOYS :
magnetic properties, 113*A*.
magnetic properties, effect of segregation, 243*A*.
IRON FOUNDING, history, England, 83*A*.
IRON INDUSTRIES :
Canada, 87*A*.
Germany, 83*A*.
Ostmark, 76*A*.
Switzerland, 12*A*.
United States, 87*A*.
IRON / IRON - SULPHIDE / VANADIUM-SULPHIDE/VANADIUM SYSTEM, 124*A*.
IRON-NICKEL ALLOYS :
delta region, 374*A*.
electrical properties, 298*A*.
magnetic properties, 117*A*., 179*A*., 233*A*., 298*A*.
thermal expansion, 179*A*.
IRON / NICKEL / NICKEL - TITANIDE / IRON-TITANIDE SYSTEM, 192*A*.
IRON-NICKEL SYSTEM, delta region, 567*P*., 583*P*.
IRON-NIOBIUM-CARBON DIAGRAM, 65*A*., 243*A*.
IRON-NIOBIUM DIAGRAM, 65*A*., 243*A*.
IRON ORE :
concentration in Lorraine, 77*A*.
fine, sintering, 207*A*.
fine, smelting, 207*A*., 266*A*., 337*A*.
flotation, 337*A*.
low-grade, smelting, 142*A*., 207*A*.
low-grade, smelting, cost calculations, 82*A*.
low-grade, smelting, effect on power supply, 337*A*.
magnetic roasting, 200*A*.
mining, Mesabi Range, 200*A*.
reduction with carbon, 10*A*.
reduction in electric furnaces, 268*A*.
reduction by hydrogen under pressure, 207*A*.
sintered, use in blast furnaces, 337*A*.
sintering, 77*A*.
sintering, effect of water on fuel consumption, 201*A*.
transport, 207*A*.
IRON ORE DEPOSITS :
Bulgaria, 316*A*.
China, 199*A*.
India, 316*A*.
Pennsylvania, 143*A*.
Russia, 76*A*., 199*A*.
South Australia, 75*A*.
Switzerland, 12*A*.
Texas, 316*A*.
IRON OXIDE, behaviour in basic open-hearth process, 278*P*.
IRON-OXIDE SYSTEMS, equilibrium at high temperatures, 190*A*.
IRON-SILICON ALLOYS :
electrical resistance, 362*A*.
magnetic properties, 233*A*.
IRON-SILICON-TITANIUM SYSTEM, 65*A*.
IRON-TITANIUM-CARBON SYSTEM, 244*A*.

JAROTSKY METHOD of refining pig iron, 143*A*.
JARROW METAL INDUSTRIES, LTD., plant, 87*A*.
JARROW TUBE WORKS, LTD., plant, 87*A*.
JOISTS, rolling, 326*P*.
JONES and LAUGHLIN STEEL CORPORATION, small-scale steel plant, 41*A*.
JUDD LEWIS COMPARATOR, 219*P*.
JUNGHANS PROCESS of rolling liquid metals, 222*A*.

KATASULF PROCESS for sulphur recovery from coke-oven gas, 140*A*.
KELLOR MACHINE for pattern making, 271*A*.
KESTNER FAKLER PROCESS for recovery of pickling liquor, 168*A*.
KETTLES, cast iron, durability in chemical industry, 125*A*.
KEY CO., foundry plant, 340*A*.
KIRKLESS SEPARATOR for slurry treatment, 333*A*.
KOHLENTECHNIK PROCESS for sulphur recovery from coke-oven gas, 140*A*.
KOHLHAAS PROCESS of rolling liquid metals, 222*A*.
KOPPERS COKE OVEN, 333*A*.
KRIVOI ROG, iron ore deposits, 76*A*.
KUZNETSKIY WORKS :
cogging mills, 156*A*.
liquid-slag operation of soaking pits, 18*A*.

LABORATORIES :
Admiralty, 186*A*.
Clyde Alloy Steel Co., Ltd., 41*A*.
Institut für chemische Technologie anorganischer Stoffe, 41*A*.

LACQUERS :
adhesion, 290*A*.
properties, 66*A*.
LADLE LININGS :
action of soda-ash slag, 263*A*.
effect on steel, 319*A*.
firebricks, 3*A*.
refractory mortars, 3*A*.
service conditions, 319*A*.
LADLES, design, 319*A*.
LAMBTON, HETTON AND JOICEY COLLIERIES LTD., coking plant, 8*A*.
LANZ PERLIT PROCESS, 209*A*.
for manufacture of high-duty cast iron, 338*A*.
LAPIX, use, 215*A*.
LATHE BED, moulding, 146*A*.
LA VENDÉE, coal deposits, 76*A*.
LEAD :
effect on cast iron, 236*A*.
effect in zinc coatings, 171*A*.
electrodeposition, 66*A*.
X-ray examination, secondary radiation, 305*A*.
LEAD-BEARING STEEL, machinability, 107*A*.
LENMETALLURGSTROY WORKS, foundry plant, 14*A*.
"LEVER RELATIONSHIP," heterogeneous equilibria, 243*A*.
LIGHT METALS, behaviour in drop-forging, 152*A*.
LIGNITE, constitution, 138*A*.
LIME :
action on refractory bricks, 325*A*.
burning, use of blast-furnace gas, 81*A*.
"LIN-DE-SURFACER MACHINE," 21*A*.
LINDLEY, extensometer, 294*A*.
LININGS :
blast-furnace, behaviour in service, 323*A*.
blast-furnace, refractory materials, 262*A*.
blast-furnace, temperature measurements, 330*A*.
blast-furnace, wear, 79*A*.
coke oven, reaction with coal ash, 3*A*.
cupola, effect of variations in operation, 269*A*.
cupola, refractory mortars, 2*A*.
cupola, silica refractories, 79*A*.
electric furnace, plastic refractories, 3*A*.
furnace, special refractories, 136*A*.
ladle, action of soda-ash slag, 263*A*.
ladle, effect on steel, 319*A*.
ladle, firebricks, 3*A*.
LININGS (*contd.*)—
ladle, refractory mortars, 3*A*.
ladle, service conditions, 319*A*.
open-hearth furnace, effect of type of fuel burnt, 319*A*.
LOCOMOTIVE FRAMES, cast steel, 13*A*.
LODED CAST IRON, properties, 182*A*., 209*A*.
LORRAINE, concentration of iron ore, 77*A*.
LOXAL PROCESS of coating metals, 66*A*.
LUBRICATED SURFACES, wear, 232*A*.
LUBRICATING OIL, specification for mild steel drums, 57*A*.
LUBRICATION :
conveyor equipment of furnaces, 223*A*.
rolling mills, 155*A*., 156*A*., 278*A*., 349*A*.
strip mills, 96*A*., 221*A*.
use of colloidal graphite, 223*A*.
LUDLUM STEEL CO., steel plant, 273*A*.
LURGI PROCESS for sulphur recovery from coke-oven-gas, 140*A*.
LYSAGHT, JOHN, LTD., strip mills, 157*A*.

MACHINABILITY :
cast iron, 273*A*.
determination by measuring cutting temperature and wear of tools, 288*A*.
lead-bearing steel, 107*A*.
nitrogen-bearing chromium steel, 132*P*.
Taylor speed in relation to reduction of area and hardness, 288*A*.
MACHINE TOOLS, use of nickel steel, 302*A*.
MACHINING, forgings, 87*A*.
MACHINING OPERATIONS, effect of cutting fluids, 31*A*.
MCKEE TOP for blast-furnaces, 336*A*.
MCKINNON INDUSTRIES, LTD., foundry plant, 340*A*.
MCQUAID-EHN TEST, 243*A*.
MAERZ PORT, for open-hearth furnaces, 319*A*.
MAGNAFLUX METHOD of testing steel, 150*A*.
MAGNESITE. *See* Refractory Materials.
MAGNESITE BRICKS. *See* Refractory Materials.
MAGNESIUM, density, 146*A*.

MAGNESIUM-SILICATE BRICKS. *See* Refractory Materials.
MAGNET STEEL :
chromium, properties, 234*A*.
tungsten, properties, 234*A*.
MAGNETIC ALLOYS, developments in Russia, 178*A*.
MAGNETIC MATERIALS, relation between elastic modulus and damping, 113*A*.
MAGNETIC METHOD for determining suitability of sheets for cold pressing, 153*A*.
MAGNETIC PERMEABILITY, iron, measurement, 50*A*.
MAGNETIC PROPERTIES :
alloy steel, 298*A*.
aluminium-manganese steel, 53*A*.
aluminium-nickel steel, 52*A*., 112*A*.
chromium - cobalt - molybdenum steel, 51*A*., 113*A*.
chromium-cobalt-tungsten steel, 51*A*.
cobalt-molybdenum steel, 52*A*.
electrical sheets, 50*A*.
iron - aluminium - cobalt - nickel alloys, 202*P*.
iron - aluminium - copper - nickel alloys, 199*P*.
iron-aluminium-nickel alloys, 187 *Paper*, 113*A*., 362*A*.
iron - aluminium - nickel alloys, effect of ageing, 296*A*.
iron-aluminium-nickel alloys, effect of elements, 178*A*.
iron-aluminium-nickel alloys, effect of titanium and molybdenum, 52*A*.
iron - aluminium - silicon alloys, 112*A*.
iron-chromium-nickel alloys, 308*A*.
iron-copper-molybdenum alloys, 296*A*.
iron-copper-nickel alloys, 113*A*.
iron-copper-nickel alloys, effect of segregation, 243*A*.
iron-nickel alloys, 117*A*., 179*A*., 233*A*., 298*A*.
iron-silicon alloys, 233*A*.
metals, 50*A*.
Mumetal, 233*A*.
nickel steel, 303*A*.
permalloy, 112*A*.
permalloy C, 233*A*.
Permendur, 112*A*.
Perminvar, 112*A*.
Stalloy, 233*A*.
transformer iron, 112*A*.
transformer steel, effect of cold rolling and recrystallisation, 51*A*.
MAGNETIC SATURATION POINTS, cementite and carbon steel, 51*A*.
MAGNETIC TESTS, 120*A*.
cast iron, 109*A*.
Magnaflux method, 150*A*.
MAGNETIC TREATMENT, malleable cast iron, for acceleration of annealing process, 145*A*.
MAGNETS :
martensitic steel for, 234*A*.
use of nickel alloys, 298*A*.
MAGNITOGORSK, iron-ore deposits, 76*A*.
MALLEABLE CAST IRON :
annealing, 85*A*., 144*A*.
annealing, acceleration by magnetic treatment, 145*A*.
annealing, short cycle, 270*A*.
effect of elements, 236*A*.
hot- and cold-working, 152*A*.
manufacture, 144*A*., 210*A*.
manufacture, duplex process, 14*A*.
pearlitic, 63*A*., 121*A*., 370*A*.
properties, 237*A*.
surface hardening, 159*A*.
wear, 232*A*.
MALLEABLE IRON CASTINGS, straightening, 270*A*.
MANGANESE :
behaviour in basic open-hearth process, 273*P*., 148*A*.
determination in iron and steel, 248*A*.
determination in steel, spectrum analysis, 232*P*.
effect in cast iron, 236*A*.
effect in steel, hydrogen attack, 126*A*.
MANGANESE-MOLYBDENUM STEEL, flame-hardening, 26*A*.
MANGANESE ORE, use in cupolas, 84*A*.
MANGANESE ORE DEPOSITS, Russia, 76*A*.
MANGANESE-SILICON STEEL, properties, 56*A*.
MANGANESE STEEL :
effect of titanium and vanadium, 367*A*.
heating and cooling curves, 373*A*.
nitrided, corrosion, 67*A*.
use for boilers, 185*A*.
uses, 301*A*.
MANGANESE-STEEL SPRINGS, properties, 57*A*.
MANGANESE TAILINGS, sintering, 200*A*.
MARTENSITE, definition, 58*A*., 188*A*.

MARTENSITIC STEEL, use for magnets, 234*A*.
MEEHANITE, properties, 209*A*.
MEMBERS, election, 13*P*.
MERCURY, effect in zinc coatings, 171*A*.
MESABI ORE :
  differential gravity separation, 265*A*.
  sintering, 207*A*.
MESABI RANGE, mining of iron ore, 200*A*.
METALLOGRAPHIC SPECIMENS, mounting, use of plastics, 59*A*.
METALLOGRAPHY, development, 120*A*.
METALLOGRAPHY AND CONSTITUTION, 58*A*., 120*A*., 187*A*., 241*A*., 305*A*., 370*A*.
METEORIC IRON, Widmanstätten structure, 372*A*.
MICROSCOPES :
  Busch Metaphot, 187*A*.
  electron, 187*A*.
  Siemens Elektron, 58*A*.
MICROSCOPY, 241*A*., 305*A*.
  limits of useful magnification, 187*A*.
MILLING MACHINES, power requirements, 107*A*.
MINE-HAULAGE GEAR, wrought iron for, 118*A*.
MINE WATER, corrosion of pipes, 309*A*.
MINERAL RESOURCES, 75*A*., 199*A*., 316*A*.
MINING :
  chrome ore, 75*A*.
  iron ore, Mesabi Range, 200*A*.
MITCHELL MAIN COLLIERY, coking plant, 80*A*.
MOISTURE :
  determination in coal, 7*A*.
  effect on cores, permeability and strength, 145*A*., 271*A*.
  effect on molten cast iron, ability to retain iron carbide, 144*A*.
  effect on moulding sand, 270*A*.
MOLYBDENUM :
  determination in iron and steel, 248*A*.
  determination in steel, spectrum analysis, 235*P*.
  effect in cast iron, 116*A*., 236*A*.
  effect in chromium-manganese steel, 117*A*.
  effect in iron-aluminium-nickel alloys, magnetic properties, 52*A*., 178*A*.
  effect in iron-chromium-nickel alloys, 67*A*.
MOLYBDENUM (*contd.*)—
  effect in steel, hydrogen attack, 126*A*.
  metallurgy, 317*A*.
  use in electric-furnace construction, 239*A*.
MOLYBDENUM-NICKEL CAST IRON, manufacture, 338*A*.
MOLYBDENUM ORE DEPOSITS :
  Poland, 317*A*.
  world, 317*A*.
MOLYBDENUM STEEL :
  flame-hardening, 26*A*.
  heat resistance, 117*A*.
  uses, 301*A*.
  welding, 165*A*.
  welding, bibliography, 165*A*.
MOLYBDENUM-STEEL PIPES, welded, properties, 228*A*.
MORRIS MOTORS, LTD., heat-treatment practice, 160*A*.
MORTARS :
  refractory, for cupola linings, 2*A*.
  refractory, ladle linings, 3*A*.
MOTOR CAR BODIES, pressing, 152*A*., 347*A*.
MOULDING :
  air-compressor cylinder, 271*A*.
  lathe bed, 146*A*.
  vacuum cylinder, 146*A*.
MOULDING MACHINES, 84*A*., 210*A*., 270*A*.
MOULDING PRACTICE, 84*A*.
  loam, 271*A*.
MOULDING SAND :
  compressive strength, 145*A*.
  conveying system, 15*A*., 270*A*.
  effect of moisture, 270*A*.
  preparation, 84*A*.
  properties, 14*A*., 84*A*., 145*A*., 338*A*.
  shearing strength, 145*A*.
  use of cement, Randupson method, 339*A*.
MULLITE. *See* Refractory Materials.
MUMETAL, magnetic properties, 233*A*.

NATURAL GAS DEPOSITS, Oklahoma, 76*A*.
NCT ALLOYS, properties, 119*A*.
"NI-CARB" HARDENING PROCESS, 225*A*.
NICHILLITE ROLLS, 210*A*.
NICHROTHERM STEEL, properties, 119*A*.
NICKEL :
  behaviour in basic open-hearth process, 276*P*.

NICKEL (*contd.*)—
determination in iron and steel, 248*A*.
determination in steel, spectrum analysis, 224*P*., 231*P*.
effect in cast iron, 116*A*., 236*A*.
effect in steel, hydrogen attack, 126*A*.
effect in steel, transformations, 374*A*.
electrodeposition, 66*A*.
electrodeposition, solution standards, 35*A*.
electrodeposition, on tinplate, 35*A*., 171*A*.
electrodeposition, use of activated carbon, 290*A*.
electrodeposition, use of nickel sulphate, 36*A*.
frettage corrosion, 377*A*.
NICKEL ALLOYS :
use for electrical equipment, 117*A*., 118*A*., 302*A*.
use for magnets, 298*A*.
NICKEL CAST IRON :
corrosion-resistance, 301*A*.
manufacture, 338*A*.
properties, 54*A*., 112*A*., 115*A*.
properties at high temperatures, 301*A*.
use in automobile industry, 301*A*.
use for internal combustion engines, 301*A*.
wear, 301*A*.
NICKEL COATINGS :
adherence, 35*A*.
bright, Hinrichsen process, 36*A*.
bright, Schlötter process, 36*A*.
bright, Weisberg and Stoddart process, 36*A*.
NICKEL-SILICON STEEL, heat-treatment, 161*A*.
NICKEL STEEL :
brittleness at high temperatures, 299*A*.
brittleness at low temperatures, 300*A*.
case-hardening, 281*A*.
elastic limit/temperature curve, 359*A*.
magnetic properties, 303*A*.
properties, 117*A*., 302*A*.
properties at high temperatures, 302*A*.
temper brittleness, 102*A*.
thermal expansion, 303*A*.
transformations, 307*A*.
use in aircraft construction, 302*A*.
use for internal-combustion engines, 302*A*.
NICKEL STEEL (*contd.*)—
use for machine tools, 302*A*.
use for marine engines, 302*A*.
use for railway rolling stock, 302*A*.
uses, 301*A*.
NICKEL-STEEL CASTINGS, properties, 302*A*.
NICKEL SULPHATE, use in nickel-plating, 36*A*.
NICKEL-TUNGSTEN STEEL, cold-drawn, heat-treatment, 101*A*.
NICROME, vacuum melting, 53*A*.
NIEBERDING WEAR-TESTING MACHINE, 177*A*.
NI-HARD, use in gas industry, 236*A*.
NIKOPOL, manganese ore deposits, 76*A*.
NIOBIUM :
determination in iron and steel, 248*A*.
effect in steel, hydrogen attack, 126*A*.
NIRONITE ROLLS, 210*A*.
NITRATES, corrosion of steel, 127*A*.
NITRIDED IRON, surface layer, 520*P*.
NITRIDED MANGANESE STEEL, corrosion, 67*A*.
NITRIDED PARTS, fatigue, 100*A*.
NITRIDING :
cast iron, 353*A*.
chromium-molybdenum-vanadium steel, 225*A*.
chromium-vanadium steel, 225*A*.
steel, 225*A*., 281*A*.
NITROGEN :
absorption by pure iron, 54*A*.
determination in fuel, 129*A*.
determination in iron and steel, 248*A*.
determination in iron and steel, vacuum fusion method, 378*A*.
effect in chromium steel, 99 *Paper*, 137*P*.
NOMENCLATURE :
microconstituents of steel, 58*A*., 188*A*.
sections of open-hearth furnaces, 323*A*.
NORMALISING, effect on structural steel, weldability, 285*A*.
NORMALISING FURNACES, control, 162*A*.
NORTON, SIR JAMES FARMER, & CO., LTD., plant, 219*A*.
NOTCH EFFECT, tensile test, 109*A*.
NOTCH-SENSITIVITY, steel, 230*A*.
NOTCHES :
effect on fatigue strength, 295*A*.
effect in fatigue tests, 177*A*.

OIL, production from coal, 9*A*., 141*A*.
OIL FUEL, burning, 141*A*.
OIL REFINERIES :
corrosion of metals, 376*A*.
failure of still tubes, 174*A*., 231*A*.
OKLAHOMA :
natural gas, 76*A*.
petroleum deposits, 76*A*.
OLSEN CUPPING TEST, 44*A*.
OPEN-HEARTH FURNACES :
acid, oxygen content of bath samples, 378*A*.
basic, design, 319*A*.
basic, durability of chrome-magnesite brick, 322*A*.
basic, ports, Friedrich, 319*A*.
basic, ports, Maerz, 319*A*.
basic, ports, Venturi, 319*A*.
basic, refractory materials, 318*A*.
basic, sloping walls, 319*A*.
basic, suspended roofs, 319*A*.
basic, use of chrome bricks, 319*A*.
basic, use of chrome-magnesite bricks, 319*A*.
basic, use of dolomite, 319*A*.
basic, use of forsterite, 319*A*.
basic, use of magnesite bricks, 319*A*.
basic, use of silica bricks, 318*A*., 319*A*.
basic, use of silica cement, 319*A*.
charging, 212*A*.
charging machines, 487*P*.
checker bricks, thermal properties and deterioration, 319*A*.
design, 212*A*.
insulation, 483*P*., 5*A*., 263*A*., 319*A*.
linings, effect of type of fuel burnt, 319*A*.
melting process, 88*A*.
nomenclature for sections, 323*A*.
output, effect of weight of charge, 273*A*.
oxygen in bath samples, 611*P*.
ports, 147*A*.
ports, failure of chrome-magnesite bricks, 202*A*.
refractory materials, 655*P*.
regenerators, design, 319*A*.
removal of combustion products, 88*A*.
roof life, 483*P*.
small scale, 41*A*.
temperature control, 319*A*.
tilting *versus* fixed, 482*P*.
use of carburetted coke-oven gas, 141*A*.
use of chrome-magnesite bricks, 136*A*.
OPEN-HEARTH FURNACES (*contd.*)—
use of magnesite bricks, 2*A*., 136*A*.
use of silica bricks, 136*A*.
warming up, 319*A*.
waste heat recovery, 87*A*., 88*A*.
OPEN-HEARTH PRACTICE :
acid, effect of working conditions on slag inclusions, 287 *Paper*.
American, 479*P*.
effect on quality on medium-carbon steel, 17*A*.
OPEN-HEARTH PROCESS :
basic, behaviour of carbon, 277*P*.
basic, behaviour of chromium, 273*P*.
basic, behaviour of iron oxide, 278*P*.
basic, behaviour of manganese, 273*P*., 148*A*.
basic, behaviour of nickel, 276*P*.
basic, behaviour of phosphorus, 276*P*.
basic, behaviour of sulphur, 148*A*.
basic, effect of fluorspar, 257 *Paper*.
basic, physical chemistry, 282*P*.
dependency of ferrous-oxide content of steel on basicity of slag, 212*A*.
reactions, 212*A*.
slag-metal equilibria, 88*A*.
OPEN-HEARTH SLAG, control, 89*A*.
OPEN-HEARTH STEEL, compared with Bessemer steel, 360*A*.
ORE DEPOSITS, Sudetenland, 199*A*.
ORES, mining and treatment, 77*A*., 200*A*.
ORGANIC SUBSTANCES, effect on steel, corrosion in acids, 196*A*.
OSTERFELD COKING PLANT, 205*A*.
OSTMARK, iron industry, 76*A*.
OTTO COKE OVENS, 81*A*.
OXIDATION :
coal humic acids, 138*A*.
steel by steam, 127*A*.
OXIDE FILMS :
determination of oxygen, 612*P*., 630*P*., 378*A*.
electron-diffraction study, 574*P*., 589*P*, 371*A*.
on steel, 188*A*.
OXIDE SYSTEMS, iron, equilibrium at high temperatures, 190*A*.
OXIDES :
determination in iron and steel, alcoholic iodine method, 381*A*., 382*A*., 383*A*.
determination in iron and steel, fractional vacuum fusion method, 378*A*.
determination in slag, 128*A*.

OXY-ACETYLENE FLAME, use for surface hardening, 224*A*.
OXYGEN :
content of iron and steel, 383*A*.
determination in iron and steel, 611*P*., 644*P*., 248*A*.
determination in iron and steel, aluminium reduction method, 379*A*.
determination in iron and steel, vacuum fusion method, 378*A*., 379*A*.
determination in oxide films, 612*P*., 630*P*., 378*A*.
in open-hearth bath samples, 611*P*., 643*P*., 378*A*.

PACTERON IRON POWDER, 119*A*.
PAINTED STEEL, corrosion tests, 40*A*.
PAINTING :
cold-pressed sheets, effect of die-lubricant, 39*A*.
pretreatment of surfaces, 33*A*.
PAINTS :
adhesion, 290*A*.
properties, 66*A*.
protective value, 39*A*., 172*A*.
use of priming coats without oil vehicles, 245*A*.
PARKER RUST-PROOFING PROCESS, 66*A*., 290*A*.
PATENTING, wire, 243*A*., 276*A*.
PATTERNS :
making, 339*A*.
making, Kellor machine, 271*A*.
shell, use for production of castings, 339*A*.
PEARLITE, definition, 58*A*.
PEAT, constitution, 138*A*.
PEAT COKE, use in carburising, 159*A*.
PENNSYLVANIA :
early blast-furnaces, 143*A*.
iron-ore deposits, 143*A*.
mineral resources, 76*A*.
PERMALLOY, magnetic properties, 112*A*.
PERMALLOY C, magnetic properties, 233*A*.
PERMEABILITY :
cores, effect of moisture, 145*A*., 271*A*.
magnetic, iron measurement, 50*A*.
PERMENDUR, magnetic properties, 112*A*.
PERMINVAR, magnetic properties, 112*A*.
PETROGRAPHY, coal, 80*A*.
PETROLEUM DEPOSITS, Oklahoma, 76*A*.
PETROVSKIY WORKS :
blast-furnace plant, 266*A*.
steel plant, 17*A*.
PHOSPHATE COATINGS, 293*A*.
Bonderising, 66*A*.
Loxal process, 66*A*.
Parkerising, 66*A*.
PHOSPHORUS :
behaviour in basic open-hearth process, 276*P*.
determination in iron and steel, 248*A*.
effect in cast iron, 236*A*.
effect in dynamo steel, 181*A*.
effect in transformer steel, 181*A*.
PHOSPHORUS STEEL, corrosion, 194*A*.
PHOTO-ELASTIC METHOD of stress measurement, 167*A*.
PHOTO-ELASTICITY, principles, 231*A*.
PHOTOGRAPHY, colour, Dufay process, 370*A*.
PHYSICAL CHEMISTRY, basic open-hearth process, 282*P*.
PHYSICS, metals, 370*A*.
PICKLING :
effect of time of immersion on brittleness of steel, 232*A*.
metals, 33*A*., 168*A*., 289*A*.
steel, 168*A*., 290*A*.
steel, action of sulphuric acid, 33*A*.
steel, Footner's process, 39*A*.
strip, 168*A*.
PICKLING BATHS, submerged heating, 33*A*.
PICKLING LIQUOR :
waste, utilisation, 34*A*., 289*A*.
waste, utilisation, Chemico process, 34*A*.
waste, utilisation, Kestner Fakler process, 168*A*.
PIETERS PROCESS for sulphur recovery from coke-oven gas, 140*A*.
PIG IRON :
basic, deoxidation of basic Bessemer steel, 88*A*.
centrifugal refining, Bradley and Foster method, 143*A*.
centrifugal refining, Jarotsky method, 143*A*.
centrifugal refining, Vroonen method, 143*A*.
effect of variations on basic Bessemer process, 207*A*.
from low-grade ore, properties, 116*A*.
manufacture, Brassert process, 11*A*.
treatment with flue dust, 10*A*.
PILSUDSKI WORKS, recuperative blast-furnace, 10*A*.

PIPE FITTINGS, specification, British, 369*A*.
PIPE FLANGES, creep, 180*A*.
PIPES :
corrosion, in mine water, 309*A*.
corrosion in soil, 245*A*., 309*A*.
corrosion in soil, effect of soil properties, 69*A*.
welded, properties, 228*A*.
welded, stresses, 105*A*.
PIPING, in ingots, 215*A*.
PISTON RINGS, heat treatment, 24*A*.
PIT-ARCH SECTIONS, rolling, 338*P*.
PITCH, coal tar, use for carburetting coke-oven gas, 140*A*.
PITTING, gear teeth, 304*A*.
PLANNING DEPARTMENT for steel plant, 16*A*.
PLASTICITY, crystals, 41*A*.
PLASTICS, use for mounting metallographic specimens, 59*A*.
PLATE, welded, stress distribution, 166*A*.
PLATE MILLS, 95*A*.
PLATES :
boiler, embrittlement, 516*P*.
boiler, failure, 175*A*.
boiler, intercrystalline cracking, 231*A*., 376*A*.
boiler, rimming steel for, 275*A*.
boiler, welded, annealing, 286*A*.
PLUMBAGO, use for foundry facings, 85*A*.
POLAND, molybdenum ore deposits, 317*A*.
POLAROGRAPH, principles and applications, 248*A*.
POLISHING :
metallographic, 241*A*., 370*A*.
metallographic, effect on transformations in stainless steel, 305*A*.
POROSITY, refractory bricks, effect of burning temperature and grain size, 78*A*.
PORT KEMBLA WORKS, steam engineering, 443 *Paper*.
PORTS :
open-hearth furnace, 147*A*.
open-hearth furnace, Friedrich, 319*A*.
open-hearth furnace, Maerz, 319*A*.
open-hearth furnace, Venturi, 319*A*.
POTASH, volatilisation from alkali-impregnated refractories, 326*A*.
POTASH - SILICA - GLASS VAPOURS, action on refractory materials, 325*A*.
POTASSIUM - CHLORIDE VAPOURS, action on refractory materials, 325*A*., 327*A*.
POTASSIUM-HYDROXIDE VAPOURS, action on refractory materials, 325*A*.
POWDER METALLURGY, 186*A*., 304*A*.
iron, 119*A*.
POWDERS, metallic sintering, 240*A*.
POWER :
consumption in Héroult furnaces, 90*A*.
requirements in deep-drawing, 219*A*.
requirements in drop forging, 217*A*.
requirements for milling machines, 107*A*.
POWER PLANT, Carnegie-Illinois Steel Corporation, 331*A*.
POWER SUPPLY, ironworks, effect of smelting low-grade ore, 337*A*.
PRESSES :
design, 92*A*., 218*A*., 347*A*.
guards for, 348*A*.
PRESSING :
automobile bodies, 347*A*.
cold, suitability of sheets, determination by magnetic method, 153*A*.
motor-car bodies, 152*A*.
sheets, effect of die lubricant on subsequent painting, 39*A*.
PRESSINGS, manufacture and applications, 152*A*.
PRESSURE VESSELS :
heat treatment, 354*A*.
welded, tests, 286*A*.
welding, 226*A*.
PROBABILITY TABLES, use in foundries, 211*A*.
PRODUCER GAS, temperature measurement, 98*A*.
PROPANE, use in carburising, 281*A*.
PROPELLERS, marine, cavitation, 126*A*.
PROPERTIES, steel, relation to service results, 237*A*.
PROPORTIONAL LIMIT, new definition, 109*A*.
PYLONS, corrosion protection, 246*A*.
PYROFAX GAS, use for carburising, 281*A*.
PYROMETERS :
colour, 99*A*.
suction, theory and application, 98*A*.
thermo-electric, 280*A*.
PYROMETRY 623*P*., 98*A*., 280*A*., 352*A*.

QUENCH-AGEING :
chromium-nickel steel, 162*A*.
non-ferrous alloys, 162*A*.
steel, 509*P*.
QUENCHED STEEL, effect of low temperature, 63*A*.
QUENCHING, effect of different cooling velocities, 561*P*., 356*A*.
QUENCHING MEDIA, effect on properties of materials, 355*A*.
QUENCHING OILS :
additions, 162*A*.
effect of additions, 27*A*.
properties, 354*A*.
specific heat, determination, 355*A*.
tests, 355*A*.
thermal conductivity, determination, 355*A*.

RADIATION, from non-luminous gases, 332*A*.
RAIL STEEL, recrystallisation, 306*A*.
RAILS :
compound-steel, manufacture, 19*A*.
corrugation, 240*A*.
fissures, 175*A*.
flash welding, 29*A*., 103*A*., 164*A*., 227*A*.
fracture, 46*A*.
martensitic, manufacture, 95*A*.
welded, fatigue, 167*A*.
RAILWAY ROLLING STOCK, use of nickel steel, 302*A*.
RAILWAY TRUCKS, welded, 227*A*.
RAILWAY WHEELS, annealing, 25*A*.
RANDUPSON PROCESS of cement moulding, 339*A*.
RAYO-TUBE-INSTRUMENT for temperature measurement, 99*A*.
RAZOR BLADES, manufacture, 101*A*.
REACTIONS :
in cupolas, 338*A*.
hydrogen and carbon in iron, 189*A*., 306*A*.
open-hearth process, 212*A*.
RECRYSTALLISATION :
effect on transformer steel, magnetic properties, 51*A*.
metals, 372*A*.
rail steel, 306*A*.
RECUPERATORS, 203*A*.
use for blast furnaces, 5*A*., 10*A*., 82*A*.
REFINING :
pig iron, Bradley and Foster method, 143*A*.
pig iron, Jarotsky method, 143*A*.
pig iron, Vroonen method, 143*A*.

REFRACTORIES COMMITTEE, First Report, *Summary*, 651*P*. *Discussion*, 653*P*. *Correspondence* 663*P*. *Committee's Reply*, 664*P*.
REFRACTORY MATERIALS :
action of alkalies, 325*A*.
action of gases, 318*A*.
action of slag, 202*A*., 318*A*., 324*A*.
alkali-impregnated, volatilisation of potash and soda, 326*A*.
for basic open-hearth furnaces, 318*A*.
for blast-furnace linings, 659*P*., 262*A*.
for casting pits, 318*A*.
manufacture, 1*A*., 202*A*.
for open-hearth furnaces, 655*P*.
porosity, effect of burning temperature and grain size, 78*A*.
properties, 1*A*., 4*A*., 78*A*., 136*A*., 202*A*., 262*A*., 318*A*.
properties and tests, 651*P*.
refractoriness-under-load test, 328*A*., 329*A*.
spalling, 202*A*.
tests, 202*A*.
thermal expansion, bibliography, 2*A*.
REFRACTORY MATERIALS (ALUMINA), thermal expansion, 2*A*.
REFRACTORY MATERIALS (ALUMINA BRICKS) :
action of lime, 325*A*.
action of slags, 324*A*.
for electric furnaces, 263*A*.
REFRACTORY MATERIALS (ANDALUSITE), use for stoppers in tapping of steel, 137*A*.
REFRACTORY MATERIALS (CARBORUNDUM), thermal expansion, 2*A*.
REFRACTORY MATERIALS (CHECKER BRICKS), thermal properties and deterioration, 319*A*.
REFRACTORY MATERIALS (CHROME), thermal expansion, 2*A*.
REFRACTORY MATERIALS (CHROME-ALUMINA BRICKS) :
properties, 320*A*.
uses, 2*A*.
REFRACTORY MATERIALS (CHROME BRICKS) :
lime bonded and barium-oxide bonded, 320*A*.
for open-hearth furnaces, 319*A*.
REFRACTORY MATERIALS (CHROME-MAGNESITE BRICKS) :
for basic open-hearth furnaces, 319*A*.
durability in basic open-hearth furnaces, 322*A*.

REFRACTORY MATERIALS (CHROME-MAGNESITE BRICKS) (*contd.*)—
for electric furnaces, 263*A*.
failure in open-hearth furnace ports, 202*A*.
for open-hearth furnaces, 136*A*.
properties, 318*A*., 320*A*.
refractoriness-under-load, 78*A*.
for steelmaking, 136*A*.
REFRACTORY MATERIALS (CHROME-MAGNESITE-DOLOMITE MIXTURES):
effect of variations in chromite-magnesite-dolomite ratio on firing shrinkage and hydration resistance, 320*A*.
relation between free lime and hydration, 321*A*.
REFRACTORY MATERIALS (CHROME-SILICA BRICKS):
properties, 320*A*.
uses, 2*A*.
REFRACTORY MATERIALS (DOLOMITE) for basic open-hearth furnaces, 319*A*.
REFRACTORY MATERIALS (DOLOMITE BRICKS), manufacture and properties, 1*A*.
REFRACTORY MATERIALS (FIRE-BRICKS):
action of lime, 325*A*.
action of slags, 324*A*.
for ladle linings, 3*A*.
lightweight, 3*A*.
REFRACTORY MATERIALS (FIRECLAY):
properties, 202*A*.
thermal expansion, 2*A*.
REFRACTORY MATERIALS (FIRECLAY BRICKS) for iron and steel works, 262*A*.
REFRACTORY MATERIALS (FORSTERITE) for basic open-hearth furnaces, 319*A*.
REFRACTORY MATERIALS (FUSED ALUMINA) for furnace linings, 136*A*.
REFRACTORY MATERIALS (FUSED MULLITE), manufacture, 1*A*.
REFRACTORY MATERIALS (JOINTING CEMENTS), properties, 327*A*., 328*A*.
REFRACTORY MATERIALS (MAGNESITE), thermal expansion, 2*A*.
REFRACTORY MATERIALS (MAGNESITE BRICKS):
for basic open-hearth furnaces, 319*A*.
for open-hearth furnaces, 2*A*.
for steelmaking, 136*A*.
REFRACTORY MATERIALS (MAGNESIUM-SILICATE BRICKS) uses, 2*A*.
REFRACTORY MATERIALS (MULLITE):
for furnace linings, 136*A*.
thermal expansion, 2*A*.
REFRACTORY MATERIALS (SILICA BRICKS):
action of lime, 325*A*.
action of slags, 324*A*.
for basic open-hearth furnaces, 318*A*., 319*A*.
cupola linings, 79*A*.
for electric furnaces, 263*A*.
properties, 318*A*.
for steelmaking, 136*A*.
thermal expansion, 2*A*.
tridymitisation, 322*A*.
REFRACTORY MATERIALS (SILICA CEMENT) for basic open-hearth furnaces, 319*A*.
REFRACTORY MATERIALS (SILICON-CARBIDE) for furnace linings, 136*A*.
REFRACTORY MATERIALS (SILLIMANITE), thermal expansion, 2*A*.
REFRACTORY MATERIALS (SILLIMANITE BRICKS) for electric furnaces, 136*A*., 263*A*.
REFRACTORY MATERIALS (SYNTHETIC SPINELS), preparation and properties, 322*A*.
REFRACTORY MORTARS:
for cupola linings, 2*A*.
ladle linings, 3*A*.
REGENERATORS, open-hearth furnace, design, 319*A*.
REHEATING FURNACES, 18*A*., 216*A*.
American, design and practice, 527*P*.
design, 220*A*.
pusher type, construction and operation, 216*A*.
for skelp, 18*A*.
Swedish "coal-tower" type, 220*A*.
RELAXATION TESTS, 114*A*.
RENAULT COMPANY, strip mills, 157*A*.
REPUBLIC STEEL CORPORATION:
blast-furnace plant, 265*A*.
descaling plant, 289*A*.
RESEARCH:
in iron and steel industry, 229*A*.
organisation in Gt. Britain, 229*A*.
RESILIENCE, springs, 49*A*.
RESINS, properties, 66*A*.
RHODESIA, chrome ore deposits, 75*A*.
RIMMING STEEL:
gas evolution, 91*A*.
heating and cooling curves, 373*A*.

RIMMING STEEL (*contd.*)—
manufacture for boiler plates, 275*A*.
segregation, 149*A*.
solidification, 91*A*., 149*A*.
solidification and structure, 214*A*.
solidification and structure, bibliography, 215*A*.
strain-age-hardening, 343*P*.
versus killed steel, 215*A*.
ROASTING, magnetic iron ore, 200*A*.
ROBERTSON BAR-STRAIGHTENING MACHINE, 222*A*.
ROCKWELL HARDNESS TESTER, 49*A*., 177*A*.
ROLL PRESSURES, measurement, 95*A*.
ROLLERS, use of chromium steel, 240*A*.
ROLLING :
alloy steel in Russia, 156*A*.
aluminium-chromium-silicon steel, 43*A*.
channels, 325*P*.
cold-, 351*A*.
cold-, effect on transformer steel, magnetic properties, 51*A*.
cold-, sheets, effect of width, 19*A*.
deformation of material, 277*A*.
effect of reduction, direction of rolling and roll diameter on deformation and properties of materials, 155*A*.
joists, 326*P*.
liquid metals, 222*A*.
pit-arch sections, 338*P*.
scale formation on steel, 19*A*.
sheets, 96*A*.
sheets, American practice, 278*A*.
sheets, roll impact and stresses in stand, 220*A*.
strip, American practice, 278*A*.
strip, effect of surface finish of rolls, and defects in billets, 20*A*.
strip, high-speed, 157*A*.
terne plates, 351*A*.
tungsten steel strip, 20*A*.
wire, determination of initial diameter, 19*A*.
wire, spread of metal, 19*A*.
ROLLING-MILL PLANT :
air-cooling, 158*A*.
Appleby-Frodingham Steel Co., Ltd., 321 *Paper*.
Australian Iron & Steel, Ltd., 221*A*.
Baldwins, Ltd., 351*A*.
Bethlehem Steel Co., 350*A*.
Carnegie-Illinois Steel Corporation, 95*A*., 157*A*., 221*A*., 278*A*., 279*A*.
ROLLING-MILL PLANT (*contd.*)—
Continental Steel Corporation, 96*A*.
Edwin Cottam & Co., Ltd., 351*A*.
Dinslaken, 96*A*.
Dorman, Long & Co., Ltd., 20*A*.
Great Lakes Steel Corporation, 87*A*.
Guest Keen Baldwins Iron and Steel Co., 351*A*.
Guest Keen & Nettlefolds, Ltd., 96*A*.
Inland Steel Co., 20*A*.
Kuznetskiy Works, 156*A*.
John Lysaght, Ltd., 157*A*.
Renault Co., 157*A*.
steam distribution, 469*P*.
Stewarts and Lloyds, Ltd., 21*A*.
ROLLING-MILL PRACTICE, 19*A*., 95*A*., 155*A*., 220*A*., 277*A*., 349*A*.
applicability of American practice to British conditions, 349*A*.
development, 220*A*.
effect on quality of medium-carbon steel, 17*A*.
ROLLING MILLS :
bar, 221*A*., 350*A*.
bearings, composition, 220*A*.
bearings, metal and synthetic resin, 156*A*.
bearings, metals for, 155*A*.
bearings, roller, suitability for heavy loads, 278*A*.
bearings, synthetic-resin, 277*A*.
cogging, 156*A*., 278*A*.
cogging, edging rolls for, 221*A*.
cogging, roll-pass design, 19*A*.
cogging, slab-turning device, 222*A*.
cold, 20*A*.
control instruments, 158*A*.
design in Germany, 95*A*.
efficiency, 277*A*.
electric driving, 97*A*., 157*A*., 278*A*., 279*A*., 351*A*.
lubrication, 155*A*., 156*A*., 221*A*., 278*A*., 349*A*.
plate, 95*A*.
roll pressure measurement, 95*A*.
section, 312 *Paper*, 96*A*.
section, roll life, 330*P*.
sheet, 20*A*., 157*A*., 350*A*., 351*A*.
sheet, capacities in America, 222*A*.
signalling systems, 158*A*.
small-scale, 41*A*.
steam-driven, 279*A*.
strip, 20*A*., 96*A*., 157*A*., 221*A*., 278*A*., 279*A*.
strip, capacities in America, 222*A*.
strip, electric driving, 97*A*.
strip, lubrication, 96*A*.
tube, electric driving, 20*A*.

ROLLS :
Adamite, 210*A*.
chilled, cracks, 210*A*.
chilled, manufacture and properties, 85*A*., 210*A*.
compound, 210*A*.
defects, 13*A*.
design for cogging mills, 19*A*.
forging, 151*A*.
grain, manufacture, 210*A*.
grinding, 349*A*.
heat-treatment furnace, 3*A*.
life, section mills, 330*P*.
manufacture, 339*A*.
Nichillite, 210*A*.
Nironite, 210*A*.
storage and transport, 277*A*.
RUHR COAL, coking properties, 8*A*.
RUSSELL, S., AND SONS, LTD., foundry plant, 14*A*.
RUSSIA :
alloy steel and ferro-alloy industries, 147*A*.
coal deposits, 76*A*.
developments in ferro-magnetic-alloys, 178*A*.
development of heat-resistant steel, 184*A*.
iron ore deposits, 76*A*., 199*A*.
manganese ore deposits, 76*A*.
rolling of alloy steel, 156*A*.

SALT BATHS :
electrode, 162*A*.
use in heat treatment, 23*A*., 224*A*.
SALT SOLUTIONS, corrosion of metals, 125*A*.
SAMPLING, coal, 129*A*.
SAND BLASTING :
blowers, 272*A*.
use in enamelling industry, 39*A*.
SANITER PROCESS for desulphurisation of iron, 261*P*.
SCALE :
formation during rolling process, 19*A*.
removal from steel, hydraulic method, 289*A*.
SCALING :
alloy steel, in atmospheres from burning petrol, 299*A*.
cast iron, 182*A*.
chromium-nickel steel, effect of sulphur-bearing gases, 282*A*.
steel, 547*P*., 568*P*., 584*P*., 100*A*.
steel, bibliography, 100*A*.
steel in sulphur-free and sulphur-bearing atmospheres, 353*A*.
SCHLÖTTER PROCESS of nickel plating, 36*A*.
SCLEROMETER HARDNESS TESTER, 49*A*.
SCRAP, alloy steel, melting in arc furnaces, 17*A*.
SEA WATER :
corrosion of steel, 67*A*.
deterioration of concrete, 67*A*.
SECTION MILLS, 321 *Paper*, 96*A*.
roll life, 330*P*.
SEGREGATION :
iron-copper-nickel alloys, effect on magnetic properties, 243*A*.
nickel - chromium - molybdenum - vanadium steel, 375*A*.
rimming steel, 149*A*.
steel, 601*P*., 628*P*., 641*P*., 345*A*.
SENDUST, magnetic properties, 112*A*.
"SERP I MOLOT" WORKS :
plant, 147*A*.
wire drawing, 94*A*.
SEYMOUR MANUFACTURING CO., nickel-plating process, 36*A*.
SHAFTS, stress determination, 177*A*.
SHARON STEEL CORP., pickling liquor recovery plant, 289*A*.
SHEAR TESTS, cast iron, 109*A*.
SHEARING STRENGTH, moulding sand, 145*A*.
SHEET-METAL MACHINERY, 92*A*., 152*A*., 218*A*., 347*A*.
SHEET MILLS, 20*A*., 157*A*., 350*A*., 351*A*.
capacities in America, 222*A*.
SHEETS :
annealing, prevention of stickers, 283*A*.
cold-pressed, effect of die-lubricant on subsequent painting, 39*A*.
cold-pressing, determination of suitability by magnetic method, 153*A*.
cold-rolled, effect of heat-treatment, 62*A*.
cold-rolling, effect of width, 19*A*.
cupping tests, Erichsen method, 44*A*.
cupping tests, Olsen method, 44*A*.
electrical, rotational hysteresis loss, 50*A*.
galvanising, 38*A*., 169*A*., 291*A*.
rolling, 96*A*.
rolling, American practice, 278*A*.
rolling, roll impact and stresses in stand, 220*A*.
stretcher strains, 43*A*.
tests, 238*A*.
weldability for aircraft construction, 228*A*.

SHEFFIELD UNIVERSITY, vacuum fusion furnace for determination of oxygen, 379*A*.
SHORE SCLEROSCOPE, 177*A*.
SHORTER HARDENING PROCESS, 224*A*.
SHRINKAGE, in welds, 166*A*.
SIEMENS ELEKTRON MICROSCOPE, 58*A*.
SIGNALLING SYSTEMS for rolling mills, 158*A*.
SILCHROME STEEL, tempering, 102*A*.
SILICA-ALUMINA SYSTEM, 202*A*.
SILICA CEMENTS. *See* Refractory Materials.
SILICA-LIME SYSTEM, 202*A*.
SILICA REFRACTORIES. *See* Refractory Materials.
SILICON :
  determination in iron and steel, 248*A*.
  determination in steel, spectrum analysis, 225*P*., 233*P*.
  effect in cast iron, 115*A*., 236*A*., 300*A*.
  effect in steel, hydrogen attack, 126*A*.
  reduction in blast-furnace, 266*A*.
SILICON CARBIDE, effect in cast iron, 360*A*.
SILICON-CARBIDE REFRACTORIES. *See* Refractory Materials.
SILICON STEEL, welding 28*A*.
SILICON STEEL STRIP, annealing, 25*A*.
SILLIMANITE. *See* Refractory Materials.
SILVER, electrodeposition, 66*A*.
SILVER COATINGS, adherence on steel, 36*A*.
SIMON-CARVES OTTO COKE OVEN, 80*A*., 333*A*.
SINTER, use in blast furnaces, 337*A*.
SINTERING :
  fine ore, 207*A*.
  iron ore, 77*A*.
  iron ore, effect of water on fuel consumption, 201*A*.
  manganese tailings, 200*A*.
  metallic powders, 240*A*.
SKELP, reheating furnaces, 18*A*.
SKODA-SAWIN WEAR TESTING MACHINE, 297*A*.
SLAG :
  action of refractory materials, 202*A*., 318*A*., 324*A*.
  basic, constitution and viscosity, 319*A*.
  blast-furnace. *See* Blast-Furnace Slag.
SLAG (*contd.*)—
  determination of iron, ferric oxide and ferrous oxide, 128*A*.
  high-manganese, production from spiegeleisen, 207*A*.
  open-hearth control, 89*A*.
  soda-ash, action on ladle linings, 263*A*.
SLAG INCLUSIONS, effect of working conditions in acid open-hearth practice, 287 *Paper*.
SLAG/METAL EQUILIBRIA, 88*A*.
SLURRY :
  treatment, coal cleaning, 204*A*.
  treatment, Kirkless separator, 333*A*.
SMELTING :
  fine ore, 207*A*., 266*A*., 337*A*.
  low-grade ore, 142*A*., 207*A*.
  low-grade ore, cost calculation, 82*A*.
  low-grade ore, effect on power supply, 337*A*.
SOAKING PITS :
  American, design and practice, 527*P*.
  liquid-slag operation, 18*A*.
SOAP INDUSTRIES, corrosion of metals, 246*A*.
SOCIÉTÉ DES ANCIENS ÉTABLISSEMENTS GIREL, welding practice, 30*A*.
SODA :
  caustic, effect on cast-iron, 209*A*.
  volatilisation from alkali impregnated refractories, 326*A*.
SODA ASH :
  effect on cast iron, fluidity and strength, 209*A*.
  use for desulphurisation of iron, 10*A*., 11*A*., 209*A*., 337*A*.
SODA-ASH SLAG, action on ladle linings, 263*A*.
SODIUM-ALUMINATE VAPOURS, action on refractory materials, 325*A*.
SODIUM CARBIDE, use for desulphurisation of iron, 337*A*.
SODIUM-CARBONATE VAPOURS, action on refractory materials, 326*A*.
SODIUM CHLORIDE, use for desulphurisation of iron, 337*A*.
SODIUM-CHLORIDE VAPOURS, action on refractory materials, 325*A*., 326*A*.
SOIL :
  corrosion of pipes, 245*A*., 309*A*.
  corrosion of pipes, effect of soil properties, 69*A*.
SOLDERING, alloy steels, 227*A*.
SOLID BODIES, temperature distribution, 99*A*.

SOLIDIFICATION :
rimming steel, 91*A*., 149*A*.
rimming steel, bibliography, 215*A*.
rimming steel, structure, 214*A*.
steel, gas evolution, 148*A*.
SORBITE, definition, 58*A*., 188*A*.
SOUTH AFRICA, coal deposits, 75*A*.
SOUTH AUSTRALIA, iron ore deposits, 75*A*.
SOUTHERN RHODESIA, chrome ore deposits, 75*A*.
SPALLING, refractory materials, 202*A*.
SPANG CHALFONT AND CO., reheating furnaces, 18*A*.
SPECIFIC GRAVITY, relation to creep strength, 299*A*.
SPECIFIC HEAT :
alloy steel, 363*A*.
quenching oils, determination, 355*A*.
steel, 557*P*.
SPECIFIC HEAT / TEMPERATURE CURVES, steel, 537*P*.
SPECIFICATIONS :
castings for gear blanks, British, 244*A*.
conduit boxes, British, 369*A*.
galvanised wire, British, 154*A*.
mild steel drums, British, 57*A*., 369*A*.
pipe fittings, British, 369*A*.
tensile tests, British, 294*A*.
tubular traction poles, British, 369*A*.
SPECTROGRAMS, spark, 228*P*.
SPECTROGRAPH, applications, 211 *Paper*.
SPECTRUM ANALYSIS, 211 *Paper*, 129*A*., 249*A*., 384*A*.
chromium - molybdenum - nickel steel, 242*P*.
determination of aluminium in steel, 225*P*.
determination of bismuth in brass, 221*P*.
determination of carbon, 383*A*.
determination of chromium in steel, 230*P*., 234*P*.
determination of cobalt in steel, 225*P*.
determination of copper in steel, 224*P*., 225*P*.
determination of manganese in steel, 232*P*.
determination of molybdenum in steel, 235*P*.
determination of nickel in steel, 224*P*., 231*P*.
determination of silicon in steel, 225*P*., 233*P*.
SPECTRUM ANALYSIS (*contd.*)—
determination of titanium in steel, 225*P*.
determination of tungsten in steel, 225*P*.
determination of vanadium in steel, 234*P*.
SPIEGELEISEN, production of high-manganese slags, 207*A*.
SPIGERVERK FURNACE, 268*A*.
SPINELS. *See* Refractory Materials.
SPRAYING :
metals, 38*A*., 171*A*., 225*A*.
zinc, 172*A*.
SPRING STEEL :
chromium-vanadium, manufacture, 94*A*.
heat treatment, 160*A*.
SPRINGS :
design, 118*A*.
heat treatment, 24*A*.
helical, permissible stresses, effect of wire curvation, 295*A*.
helical, properties, 111*A*.
resilience, 49*A*.
valve, steels for, 56*A*.
STAINLESS STEEL :
development, 183*A*., 343*A*.
frettage corrosion, 377*A*.
permanency, 66*A*.
properties, 107*A*.
spot welding, 104*A*.
standardisation, 239*A*.
transformation induced by polishing, 305*A*.
working, 347*A*.
STAINLESS STEEL COATINGS, adherence, 35*A*.
STAINLESS STEEL WIRE :
annealing, 225*A*.
uses, 94*A*.
STALLOY, magnetic properties, 233*A*.
STAMPING DIES, steel for, 219*A*.
STANDARDISATION :
electrodeposited coatings, 290*A*.
stainless steel, 239*A*.
STATABLOC WIRE DRAWING MACHINE, 276*A*.
STEAM :
distribution in steelworks, 465*P*.
oxidation of steel, 127*A*.
STEAM ENGINEERING, Port Kembla Works, 443 *Paper*.
STEEL :
annealing, 101*A*.
alloy, brazing, 227*A*.
alloy, changes below 400° C., 359*A*.
alloy, development, 55*A*., 238*A*.
alloy, effect of grain size, 123*A*.
alloy, electrical resistance, 363*A*.

STEEL (*contd.*)—
alloy, forging, 151*A*.
alloy, heat treatment, 161*A*.
alloy, magnetic properties, 298*A*.
alloy, rolling in Russia, 156*A*.
alloy, scaling in atmospheres from burning petrol, 299*A*.
alloy, soldering, 227*A*.
alloy, specific heat, 363*A*.
alloy, thermal conductivity, 363*A*.
alloy, thermal expansion, 363*A*.
alloy, torsional elastic limit, 359*A*.
alloy, total heat, 363*A*.
alloy, transformations, 563*P*., 582*P*., 596*P*.
alloy, transformations, intermediate, 373*A*.
alloy, transformations, isothermal, 374*A*.
alloy, uncooled, annealing, 25*A*.
alloy, use in collieries, 302*A*.
alloy, use for exhaust-gas turbines, 299*A*.
alloy, use for low-temperature valves, 185*A*.
alloy, uses, 301*A*.
alloy, welded, impact strength and hardness, 42*A*.
alloy (low), properties, 117*A*., 239*A*.
alloy (low), welding, 165*A*.
behaviour in drop forging, 152*A*.
boiler, properties at high temperatures, 366*A*.
brittleness at low temperatures, 300*A*.
carburising, 225*A*.
cavitation, 125*A*.
Chapmanising, 225*A*.
clad, flame cutting, 30*A*.
clad, manufacture, 291*A*.
clad, tests, 35*A*.
coated, welding, 357*A*.
coated, welding, bibliography, 357*A*.
coating with copper-nickel-tin alloys, 301*A*.
coating with white cast iron, 301*A*.
cold-drawn, annealing, low temperature, 26*A*.
cold-drawn, heat treatment, 101*A*.
cold-worked, annealing, 26*A*.
composite, flame-cutting, 30*A*.
composite, manufacture, 291*A*.
corrosion, effect of carbon, 194*A*.
corrosion in acids, effect of organic substances, 196*A*.
corrosion by nitrates, 127*A*.
corrosion in sea water, 67*A*.
STEEL (*contd.*)—
corrosion in sulphur-bearing gases, 195*A*.
corrosion in water, 195*A*.
corrosion-fatigue, 111*A*., 377*A*.
corrosion-resistant, development, 183*A*.
corrosion-resistant, properties, 365*A*.
creep, effect of manufacturing variables, 44*A*.
cyaniding, 281*A*.
decarburisation, 24*A*., 100*A*.
decarburisation, bibliography, 100*A*.
deep-drawing, manufacture, 212*A*.
defects, 43*A*., 195*A*.
deformation-resistance, heat-treatment, 354*A*.
degreasing, 168*A*.
descaling, 289*A*.
dissolution in sulphuric acid, 69*A*.
drawn, heat treatment, 25*A*.
dry-cyaniding, 225*A*.
dynamo, effect of phosphorus and arsenic, 181*A*.
effect of aluminium, 300*A*.
effect of annealing, 161*A*.
effect of arsenic, 368*A*.
effect of austenite grains, 372*A*.
effect of cold-work, 26*A*., 243*A*.
effect of gases, 180*A*.
effect of high-frequency currents, 555*P*., 576*P*., 590*P*., 362*A*.
effect of hydrogen, 196*A*.
effect of ladle linings, 319*A*.
effect of titanium, 367*A*.
effect of vanadium, 55*A*.
electrical resistance/temperature curves, 435 *Paper*.
elongation, effect of speed of stretching and rate of loading, 230*A*.
embrittlement, 513*P*., 515*P*.
enamelling, 293*A*.
fatigue, 111*A*.
fatigue, changes in crystal structure, 47*A*., 295*A*.
fatigue strength, effect of corrosion, 43*A*.
fatigue strength, effect of corrosion and abrupt changes in section, 231*A*.
ferrite spots, 242*A*.
frettage corrosion, 377*A*.
galvanised, structure, 123*A*.
galvanising, 37*A*., 170*A*.
grain size, relation to inclusions, 242*A*.
hair-line cracks, 150*A*., 346*A*.

STEEL (*contd.*)—
hardenability, 296*A*.
hardening, 101*A*.
heat-resistant, brittleness at high temperatures, 299*A*.
heat-resistant, development, 183*A*.
heat-resistant, development in Russia, 184*A*.
heat-resistant, etching, 241*A*.
heat-resistant, properties, 117*A*., 365*A*.
heating and cooling curves, 373*A*.
high-tensile, welding, 285*A*., 357*A*.
hydrogen attack, effect of elements, 126*A*., 196*A*.
inclusions, 180*A*., 235*A*.
inclusions, bibliography, 180*A*.
inverse-rate curves, 537*P*.
killed and effervescing, 215*A*.
lead-bearing, machinability, 107*A*.
martensitic, use for magnets, 234*A*.
medium-carbon, effect of open-hearth and rolling practice on quality, 17*A*.
molten, temperature measurement, 98*A*., 280*A*., 352*A*.
nitriding 225*A*., 281*A*.
notch-sensitivity, 230*A*.
oxidation by steam, 127*A*.
oxide films, 188*A*.
oxy-acetylene cutting, 357*A*.
painted, corrosion tests, 40*A*.
pickling, 168*A*., 290*A*.
pickling, action of sulphuric acid, 33*A*.
pickling, Footner's process, 39*A*.
pickling-brittleness, effect of time of immersion, 232*A*.
production, 16*A*., 87*A*., 147*A*., 212*A*., 273*A*., 342*A*.
production, control, 147*A*., 149*A*., 274*A*.
production, surface reaction method, 274*A*.
properties at high temperatures, 365*A*.
properties, relation to service results, 237*A*.
quench-ageing, 509*P*.
quenched, effect of low temperatures, 63*A*.
rail, recrystallisation, 306*A*.
rimming, gas evolution, 91*A*.
rimming, heating and cooling curves, 373*A*.
rimming, manufacture for boiler plates, 275*A*.
rimming, segregation, 149*A*.
rimming, solidification, 91*A*., 149*A*.
STEEL (*contd.*)—
rimming, solidification and structure, 214*A*.
rimming, solidification and structure, bibliography, 215*A*.
rimming, strain-age-hardening, 343*P*.
rimming *versus* killed steel, 215*A*.
rolled, defects, 150*A*.
rolling, effect of reduction, direction of rolling and roll diameter, 155*A*.
scaling, 547*P*., 568*P*., 584*P*., 100*A*.
scaling, bibliography, 100*A*.
scaling, in sulphur-free and sulphur-bearing atmospheres, 353*A*.
segregation, 601*P*., 628*P*., 641*P*., 345*A*.
solidification, gas evolution, 147*A*.
specific heat, 557*P*.
specific heat/temperature curves, 537*P*.
spot welding, 104*A*.
strain-age-hardening, 341 *Paper*.
structure, effect of vanadium, 306*A*.
temper-hardening, 283*A*.
tempering, 101*A*.
tensile properties, effect of cold work, 341*P*.
tensile properties at high temperatures, 53*A*.
tensile-torsion tests, 173*A*.
thermal conductivity, 364*A*.
transformations, effect of nickel and chromium, 374*A*.
transformations, heat evolution, 537*P*.
transformer, effect of elements, 114*A*.
transformer, effect of phosphorus and arsenic, 181*A*.
transformer, magnetic properties, effect of cold-rolling and recrystallisation, 51*A*.
transformer, magnetic properties, effect of segregation, 243*A*.
velocity-sensitivity, 230*A*.
weldability, 226*A*.
welding, effect of sulphur, 358*A*.
X-ray examination, secondary radiation, 305*A*.
yield point, 41*A*., 229*A*.
STEEL COMPANY OF CANADA LTD., gas distribution and control system, 140*A*.
STEEL PLANTS :
Australian Iron and Steel, Ltd., 87*A*.

STEEL PLANTS (*contd.*)—
Brown Bayley's Steel Works, Ltd., 273*A*.
Carnegie-Illinois Steel Corporation, 16*A*.
Cogne Co., 16*A*.
Dorman, Long & Co., Ltd., 16*A*.
Elektrostal works, 149*A*.
Great Lakes Steel Corporation, 87*A*.
Ludlum Steel Co., 273*A*.
Petrovskiy Works, 17*A*.
planning department, 16*A*.
"Serp I Molot" Works, 147*A*.
Workington Iron and Steel Co., 342*A*.
Zaporozhstal' works, 212*A*.
STELLITING, metals, 227*A*.
STEWARTS AND LLOYDS, LTD., tube mills, 21*A*.
STICKERS, prevention in annealing of sheets, 283*A*.
STILL TUBES, failure in oil refineries, 174*A*., 231*A*.
STRAIGHTENING, malleable iron castings, 270*A*.
STRAIGHTENING MACHINES :
for bars, Robertson, 222*A*.
roller, 333*P*.
STRAIN-AGE-HARDENING, mild steel, 341 *Paper*.
STRAIN-AGEING, strip for automobile bodies, 387 *Paper*.
STRAUSS COPPER-SULPHATE TEST, 196*A*.
STRENGTH, effect of form and scale of materials, 174*A*.
STRESSES :
distribution in welded plate, 166*A*.
internal, effect of time during alternating bend tests, 42*A*.
measurement, photo-elastic method, 167*A*.
measurement in tensile tests, 242*A*.
measurement, X-ray method, 110*A*., 241*A*., 242*A*.
permissible in helical springs, effect of wire curvation, 295*A*.
relief in welds, 29*A*.
residual, effect on welded seams, 166*A*.
in rolling-mill stand during rolling of steels, 220*A*.
in shafts, determination, 177*A*.
in welded joints, study by means of elastic models, 166*A*.
in welded pipes, 105*A*.
during wire drawing, 93*A*.
STRETCHER STRAINS in sheet and strip, 43*A*.
STRINGFELLOW WIRE-DRAWING BLOCK, 276*A*.
STRIP :
alloy steel, annealing, 23*A*.
coiling, 279*A*.
cold-rolled, annealing, 282*A*., 354*A*.
cold-rolled, defects, 97*A*.
deep-drawing, 92*A*.
effect of cold-work, 387*P*.
galvanising, 37*A*.
grinding, 158*A*.
pickling, 168*A*.
rolling, American practice, 278*A*.
rolling, effect of surface finish of rolls, and defects in billets, 20*A*.
rolling, high-speed, 157*A*.
silicon steel, annealing, 25*A*.
strain-ageing, 387 *Paper*.
stretcher strains, 43*A*.
tungsten steel, rolling, 20*A*.
STRIP MILLS, 20*A*., 96*A*., 157*A*., 221*A*., 278*A*., 279*A*.
capacities in America, 222*A*.
electric driving, 97*A*.
lubrication, 96*A*.
STRUCTURAL STEEL :
effect of oxy-acetylene cutting, 105*A*.
damping capacity, 304*A*.
high-tensile, welding, 285*A*.
weldability, effect of normalising, 285*A*.
STRUCTURE :
atomic, metals, 121*A*.
cast iron, relation to tensile strength, 116*A*.
cast steel, effect of cooling rate, 191*A*.
chromium steel, 123*A*.
compressed iron, 60*A*.
crystal, changes during fatigue stress, 47*A*., 295*A*.
galvanised steel, 123*A*.
iron, after drawing, swaging and elongation, 294*A*.
refinement in castings, 61*A*.
relation to creep strength, 299*A*.
rimming steel, 214*A*.
rimming steel, bibliography, 215*A*.
steel, effect of vanadium, 306*A*.
Widmannstätten, meteoric iron, 372*A*.
STÜRZELBERG FURNACE, desulphurisation of iron with burnt lime, 143*A*.
SUDETENLAND :
coal deposits, 199*A*.
graphite deposits, 199*A*.
ore deposits, 199*A*.

SULPHUR :
behaviour in open-hearth process, 148*A*.
determination in iron and steel, 248*A*.
effect in cast iron, 236*A*.
effect in steel, welding, 358*A*.
recovery from coke-oven gas, Alkazid process, 140*A*.
recovery from coke-oven gas, Gerbotol process, 140*A*.
recovery from coke-oven gas, Katasulf process, 140*A*.
recovery from coke-oven gas, Kohlentechnik process, 140*A*.
recovery from coke-oven gas, Lurgi process, 140*A*.
recovery from coke-oven gas, Pieters process, 140*A*.
SULPHUR DIOXIDE, determination in gases, 249*A*.
SULPHURIC ACID :
action in pickling steel, 33*A*.
dissolution of steel, 69*A*.
SURFACE-FINISHING MACHINERY, 32*A*.
SURFACE-REACTION METHOD for manufacture of steel, 274*A*.
SURFACES, determination of roughness, 376*A*.
SWELLING, coal, 8*A*., 138*A*., 139*A*., 264*A*., 334*A*.
SWITZERLAND :
iron industry, 12*A*.
iron ore deposits, 12*A*.

TAINTON GALVANISING PROCESS, 171*A*.
TANTALUM, determination in iron and steel, 248*A*.
TANTALUM CARBIDE, cemented, properties, 225*A*.
TATA IRON AND STEEL WORKS, coking plant, 333*A*.
TELLURIUM, determination, 248*A*.
TEMPER BRITTLENESS :
chromium-nickel steel, 102*A*.
nickel steel, 102*A*.
TEMPER-HARDENING, steel, 283*A*.
TEMPERATURES :
burning, effect on refractory bricks, porosity, 78*A*.
control, open-hearth furnaces, 319*A*.
cutting, tools, as indication of machinability, 288*A*.
distribution in solid bodies, 99*A*.
flame, measurement, 98*A*.
gas, control, 6*A*.
TEMPERATURES (*contd.*)—
gas, measurement, 98*A*.
gas, measurement, aspirating thermocouples, 98*A*.
gas, measurement in boilers, 98*A*.
gas, measurement in chemical industry, 98*A*.
gas, measurement in glass furnaces, 98*A*.
high, brittleness of heat-resistant steel, 299*A*.
high, equilibrium of iron oxide systems, 190*A*.
high, fatigue of chromium-molybdenum-nickel steel, 47*A*.
high, fatigue, chromium-nickel steel, 47*A*.
high, properties of boiler steel, 366*A*.
high, properties of carbon steel, 114*A*.
high, properties of nickel cast iron, 301*A*.
high, properties of nickel steel, 302*A*.
high, properties of steel, 365*A*.
high, tensile properties of steel, 53*A*.
high, yield stress of metals, effect of deformation rate, 115*A*.
low, brittleness of metals, 300*A*.
low, effect on quenched steel, 63*A*.
measurement, 623*P*.
measurement in annealing furnaces, 354*A*.
measurement, blast-furnace linings, 330*A*.
measurement in high-pressure containers, 98*A*.
measurement, Rayo-tube instrument, 99*A*.
measuring instruments for rolling mills, 158*A*.
molten iron and steel, measurement, 98*A*., 280*A*., 352*A*.
producer gas, measurement, 98*A*.
TEMPERING :
Silchrome steel, 102*A*.
steel, 101*A*.
TEMPERING FURNACE, Cyclone, 283*A*.
TENSILE - FATIGUE STRENGTH, welded joints, 228*A*.
TENSILE PROPERTIES :
mild steel, effect of cold-work, 341*P*.
steel at high temperature, 53*A*.
TENSILE STRENGTH :
cast iron, relation to structure, 116*A*.
weld metal, 104*A*.

TENSILE TESTING MACHINES, 294*A*.
TENSILE TESTS :
impact, 110*A*.
notch effect, 109*A*.
specification, British, 294*A*.
stress measurement, 242*A*.
TENSILE-TORSION TESTS, metals, 173*A*.
TERNE PLATES, rolling, 351*A*.
TEST BARS, bend, stress measurement, X-ray methods, 110*A*.
TESTING MACHINES :
fatigue, 175*A*.
fatigue, Torsator, 360*A*.
hardness, 294*A*., 295*A*.
hardness, Firth Hardometer, 49*A*.
hardness, Herbert, 49*A*.
hardness, Rockwell, 49*A*., 177*A*.
hardness, sclerometer, 49*A*.
hardness, Shore scleroscope, 177*A*.
hardness, Vickers, 49*A*.
impact, repeated, 174*A*.
tensile, 294*A*.
wear, Nieberding, 177*A*.
wear, Skoda–Sawin, 297*A*.
TESTS :
bend, alternating, effect of time on internal stresses, 42*A*.
bend, cast iron, 109*A*.
cast iron, use of ring-shaped specimens, 116*A*.
clad steel, 35*A*.
constant strain-rate, at high temperatures, 115*A*.
corrosion, 194*A*., 196*A*.
corrosion, Dupont and Huey, 196*A*.
corrosion, painted steel, 40*A*.
corrosion, protective coatings, 196*A*.
corrosion, Strauss copper sulphate test, 196*A*.
creep, evaluation of results, 298*A*.
cupping, Erichsen method, 44*A*.
cupping, Olsen method, 44*A*.
elasticity, cast iron, 109*A*.
electrical, 120*A*.
fatigue, effect of notches and shape of specimen, 177*A*.
fracture formation, 231*A*.
hardness, history, 48*A*.
impact, 230*A*.
impact, carbon steel, 173*A*.
impact, cast iron, 109*A*.
impact, notched bar, interpretation, 173*A*.
impact tensile, 110*A*.
impact, welded joints, 42*A*.
impact, welded joints, bibliography, 42*A*.
McQuaid–Ehn, 243*A*.
TESTS (*contd.*)—
magnetic, 120*A*.
magnetic, cast iron, 109*A*.
magnetic, Magnaflux method, 150*A*.
non-destructive, 120*A*.
quenching oils, 355*A*.
refractoriness-under-load, 328*A*., 329*A*.
refractory materials, 202*A*.
relaxation, 114*A*.
shear, cast iron, 109*A*.
sheets, 238*A*.
tensile, notch effect, 109*A*.
tensile, specification, British, 294*A*.
tensile, stress measurement, 242*A*.
tensile-torsion, metals, 173*A*.
torsion, cast iron, 110*A*.
welded pressure vessels, 286*A*.
welds, 43*A*., 103*A*., 105*A*., 165*A*.
wire rope, 46*A*.
TEXAS, iron ore deposits, 316*A*.
THERMAL ANALYSIS, steel, 373*A*.
THERMAL CONDUCTIVITY :
alloy steel, 363*A*.
iron and steel, 364*A*.
quenching oils, determination, 355*A*.
THERMAL CURVES, interpretation, 147 *Paper*.
THERMAL EXPANSION :
alloy steel, 363*A*.
chromium-nickel steel, 117*A*.
iron-nickel alloys, 179*A*.
nickel steel, 303*A*.
refractory materials, 2*A*.
refractory materials, bibliography, 2*A*.
THERMOCOUPLES, 352*A*.
aspirating, for gas temperature measurement, 98*A*.
" quick-immersion," 352*A*.
theory, 280*A*.
theory and application, 98*A*.
THERMO-ELECTRIC FORCES, measurement, 53*A*.
TIE-RODS, automobile, forging, 151*A*.
TIN :
electrodeposition, 170*A*.
electrodeposition, from acid sulphate solutions, 171*A*.
TIN COATINGS :
discontinuities, 292*A*.
flux inclusions, 171*A*.
TINNED FOODS, early types, examination, 70*A*.
TINPLATE :
discontinuities in coatings, 292*A*.
nickel and chromium plated, 35*A*., 171*A*.

TITANIUM :
determination in iron and steel, 248*A*.
determination in steel, spectrum analysis, 225*P*.
effect in cast iron, 115*A*., 116*A*.
effect in cast iron, graphitisation, 180*A*.
effect in chromium cast iron, 142*P*.
effect in chromium-nickel steel, 303*A*.
effect in chromium steel, 142*P*.
effect in iron-aluminium-nickel alloys, magnetic properties, 52*A*., 178*A*.
effect in iron and steel, 367*A*.
effect in manganese steel, 367*A*.
effect in steel, hydrogen attack, 126*A*.
effect in transformer steel, 114*A*.
production and industrial uses, 182*A*.
reduction in blast furnace, 266*A*.
TITANIUM CARBIDE, cemented, properties, 225*A*.
TOOL LIFE, relation to cutting speed, 107*A*.
TOOL STEEL :
grain size, 49*A*., 62*A*., 188*A*.
heat treatment, 223*A*.
manufacture in electric furnaces, 89*A*.
properties, 31*A*.
TOOL-STEEL INGOTS, forging, 218*A*.
TOOLS :
machine, selection of cutting fluids, 31*A*.
machine, use of nickel steel, 302*A*.
wear and cutting temperature, as indication of machinability, 288*A*.
TORSATOR FATIGUE TESTING MACHINE, 360*A*.
TORSION TESTS, cast iron, 110*A*.
TORSIONAL-ELASTIC-LIMIT/TEMPERATURE CURVES, alloy steel, 359*A*.
TOWNSEND CO., wire-annealing practice, 161*A*.
TRACTION POLES, tubular, specification, British, 369*A*.
TRANSFORMATIONS :
alloy steel, 563*P*., 582*P*., 596*P*.
alloy steel, intermediate, 373*A*.
alloy steel, isothermal, 374*A*.
austenite, in cast iron, 307*A*.
austenite in chromium-nickel steel, 192*A*.
austenite in high-speed steel, 192*A*.
austenite, isothermal, 64*A*.
TRANSFORMATIONS (*contd.*)—
carbon steel, delta, 373*A*.
chromium - molybdenum - nickel steel, 559*P*.
iron-cobalt alloys, 577*P*., 374*A*.
iron-cobalt-nickel alloys, 243*A*.
nickel steel, 307*A*.
stainless steel, induced by polishing, 305*A*.
steel, effect of nickel and chromium, 374*A*.
steel, heat evalution, 537*P*.
TRANSFORMER IRON, magnetic properties, 112*A*.
TRANSFORMER STEEL :
effect of elements, 114*A*.
effect of phosphorus and arsenic, 181*A*.
magnetic properties, effect of cold-rolling and recrystallisation, 51*A*.
magnetic properties, effect of segregation, 243*A*.
TREASURER'S REPORT, 7*P*.
TROMP COAL-CLEANING PROCESS, 139*A*., 204*A*.
TROOSTITE, definition, 58*A*., 188*A*.
TUBE DRAWING PLANT, Chesterfield Tube Co., 222*A*.
TUBE MILLS, electric driving, 20*A*.
TUBES :
autofrettage, stresses and deformations, 46*A*.
boiler, failure, 175*A*.
chromium - molybdenum steel, fatigue, 176*A*.
chromium-molybdenum steel, heat treatment by electric currents, 160*A*.
creep, when subjected to internal pressure, 45*A*.
still, failure in oil refineries, 174*A*., 231*A*.
welded, bend fatigue strength, 227*A*.
welding, Fretz-Moon process, 164*A*.
TUNGSTEN :
determination in iron and steel, 248*A*.
determination in steel, spectrum analysis, 225*P*.
effect in chromium-manganese steel, 117*A*.
effect in iron-aluminium-nickel alloys, magnetic properties, 178*A*.
effect in steel, hydrogen attack, 126*A*.
use in electric furnace construction, 239*A*.

TUNGSTEN CARBIDE, cemented, properties, 225*A*.
TUNGSTEN MAGNET STEEL, properties, 234*A*.
TUNGSTEN STEEL, drawing, 101*A*.
TUNGSTEN STEEL STRIP, rolling, 20*A*.
TURBINE HOUSINGS, cast iron for, 115*A*.
TURBINES, exhaust-gas, alloy steels for, 299*A*.
TURBO-BLOWER, for blast furnace, 336*A*.
TURKEY, coking plants, 264*A*.
TUYERES, for blast-furnaces, 265*A*.
TYRE STEEL, fatigue, 47*A*.

UKRAINE, mineral resources, 316*A*.
UNIONMELT METHOD of welding, 284*A*.
UNITED KINGDOM :
  coal-cleaning developments, 203*A*.
  coking industry, 264*A*.
  history of iron founding, 83*A*.
  organisation of research, 229*A*.
  specification for castings for gear blanks, 244*A*.
  specification for conduit boxes, 369*A*.
  specification for galvanised wire, 154*A*.
  specification for mild steel drums, 369*A*.
  specification for mild steel drums for lubricating oil, 57*A*.
  specification for pipe fittings, 369*A*.
  specification for tensile tests, 294*A*.
  specification for tubular traction poles, 369*A*.
UNITED STATES :
  blast-furnace dimensions and capacity, 336*A*.
  capacities of sheet and strip mills, 222*A*.
  coal-cleaning developments, 203*A*.
  coal preparation, 200*A*.
  coal resources, 200*A*.
  electric furnace practice, 496*P*.
  iron industry, 87*A*.
  iron ore deposits, 316*A*.
  iron ore resources, 200*A*.
  natural gas deposits, 76*A*.
  open-hearth practice, 479*P*.
  petroleum deposits, 76*A*.
  rolling of sheets and strip, 278*A*.
  soaking pit and reheating-furnace design and practice, 527*P*.
URALS :
  iron ore deposits, 199*A*.
  mineral deposits, 76*A*.
URANIUM, determination in iron and steel, 248*A*.

VACUUM FUSION FURNACE, for determination of oxygen, 379*A*.
VACUUM MELTING, effect on alloys, 53*A*.
VALVE SPRINGS, steels for, 56*A*.
VALVES :
  aircraft, chromium-manganese-nickel-silicon steel for, 184*A*.
  coating of, 164*A*.
  low-temperature, alloy steel for, 185*A*.
VANADIUM :
  determination in iron and steel, 128*A*., 248*A*.
  determination in steel, spectrum analysis, 234*P*.
  effect in cast iron, 116*A*.
  effect in iron-aluminium-nickel alloys, magnetic properties, 178*A*.
  effect in manganese steel, 367*A*.
  effect in steel, 55*A*.
  effect in steel, hydrogen attack, 126*A*.
  effect in steel, structure, 306*A*.
  effect in transformer steel, 114*A*.
VANADIUM-BEARING SLAGS, use for ferro-vanadium production, 142*A*.
VANADIUM STEEL :
  creep, effect of manufacturing variables, 44*A*.
  effect of cooling rate, 64*A*.
VELOCITY-SENSITIVITY, steel, 230*A*.
VENTURI PORT for open-hearth furnaces, 319*A*.
VIBRATIONS :
  determination, 48*A*.
  measurement, 112*A*.
VICKERS HARDNESS TESTER, 49*A*.
VISCOSITY, basic slags, 319*A*.
VOLOGDIN HARDENING PROCESS, 282*A*.
VROONEN METHOD of refining pig iron, 143*A*.

WALTON PROCESS of rolling liquid metals, 222*A*.
WASHERS, self-locking, heat-treatment, 354*A*.
WATER :
  corrosion of chromium-nickel steel, 246*A*.
  corrosion of metals, 125*A*.
  corrosion of steel, 195*A*.

WATER (*contd.*)—
effect of treatment on corrosion, 68*A*.
mine, corrosion of pipes, 309*A*.
WEAR :
automobile cylinder blocks, 177*A*.
automobile cylinders, 112*A*.
blast-furnace linings, 79*A*.
brake drums, 297*A*.
cast iron, 177*A*., 232*A*., 297*A*.
Diesel-engine cylinders, 297*A*.
lubricated surfaces, 232*A*.
malleable cast iron, 232*A*.
metals, 177*A*., 361*A*.
metals in clay plants, 297*A*.
nickel cast iron, 301*A*.
tools, as indication of machinability, 288*A*.
WEAR TESTING MACHINE :
Nieberding, 177*A*.
Skoda-Sawin, 297*A*.
WEISBERG AND STODDART PROCESS of nickel plating, 36*A*.
WELD METAL :
gas evolution, 285*A*.
tensile strength, 104*A*.
WELDABILITY :
carbon steel, 105*A*.
sheets for aircraft construction, 228*A*.
steel, 226*A*.
WELDED BOILER PLATE, annealing, 286*A*.
WELDED JOINTS :
corrosion resistance, 287*A*.
effect of eccentricity, 166*A*.
fatigue, 42*A*.
hardness, 42*A*.
impact tests, 42*A*.
impact tests, bibliography, 42*A*.
stresses, study by means of elastic models, 167*A*.
tensile-fatigue strength, 228*A*.
WELDED PARTS, compared with castings, 28*A*., 226*A*., 357*A*.
WELDED PIPES :
stresses, 105*A*.
welded, properties, 228*A*.
WELDED PLATE, stress distribution, 166*A*.
WELDED PRESSURE VESSELS, tests, 286*A*.
WELDED RAILS, fatigue, 167*A*.
WELDED RAILWAY TRUCKS, 227*A*.
WELDED SEAMS, effect of residual stress, 166*A*.
WELDED STEEL :
alloy, fatigue, 42*A*.
alloy, impact strength and hardness, 42*A*.
WELDED STRUCTURES, design, 227*A*.
WELDED TUBES, bend fatigue strength, 227*A*.
WELDERS, training, 226*A*.
WELDING :
boilers, 103*A*., 163*A*.
cast iron, 357*A*.
castings, 163*A*.
chromium - molybdenum steel, 104*A*.
chromium-nickel steel, 28*A*.
chromium steel, 28*A*.
chromium steel, effect of nitrogen, 138*P*.
coated steel, 357*A*.
coated steel, bibliography, 357*A*.
electric, 163*A*., 285*A*.
electric, assembly of parts, 29*A*.
electric, crater formation, 103*A*.
electric, metallurgy, 226*A*.
electric resistance, 284*A*.
electric, Unionmelt method, 284*A*.
European and American practice compared, 28*A*.
flash, rails, 29*A*., 103*A*., 164*A*., 227*A*.
forging dies, 357*A*.
gas, containers, 30*A*.
high-tensile steel, 285*A*., 357*A*.
low-alloy steel, 165*A*.
molybdenum steel, 165*A*.
molybdenum steel, bibliography, 165*A*.
pressure vessels, 226*A*.
projection, 163*A*.
silicon steel, 28*A*.
spot, 163*A*.
spot, steel, 104*A*.
steel, effect of sulphur, 358*A*.
tubes, Fretz-Moon process, 164*A*.
WELDING ELECTRODES :
development, 164*A*.
resistance, 104*A*.
WELDING MACHINES, 284*A*.
electric, 163*A*.
WELDING RODS, coated, drying, 164*A*.
WELDS :
bend fatigue strength, 167*A*.
cracks in, 286*A*.
shrinkage, 166*A*.
stress relief, 29*A*.
tests, 43*A*., 103*A*., 105*A*., 165*A*.
thermal disturbances in relation to hardness, 104*A*.
WHEELS, railway, annealing, 25*A*.
WIDMANNSTÄTTEN STRUCTURE, meteoric iron, 372*A*.
WILLIAMS, J. H., & Co., drop forging plant, 92*A*.

WILLIAMS DEVICE to prevent local heating of galvanising pots, 37*A*.
WILLIAMS PRIZE, awarded to D. V. Krishna Rao, 13*P*.
WILSONTOWN, history, 337*A*.
WINE INDUSTRY, corrosion of metals, 245*A*.
WIRE :
aluminium-coated, Alplate process, 169*A*.
annealing, 161*A*.
bi-metallic, manufacture, 153*A*.
coiling machines, 94*A*.
copper-clad steel, manufacture, 153*A*.
drawing, conical and curved dies, 93*A*.
drawing, French methods, 153*A*., 154*A*.
drawing, fundamentals, 93*A*.
drawing, history, 93*A*., 154*A*.
drawing, Statabloc machine, 276*A*.
drawing, stresses during, 93*A*.
drawing, Stringfellow reactive block, 276*A*.
drawing, triangular cross section, 153*A*.
fatigue strength, effect of decarburisation, 48*A*.
galvanised, specification, British, 154*A*.
galvanising, 170*A*.
high-speed steel, drawing, 94*A*.
patenting, 243*A*., 276*A*.
rolling, determination of initial diameter, 19*A*.
rolling, spread of metal, 19*A*.
stainless steel, annealing, 225*A*.
stainless steel, uses, 94*A*.
WIRE ROPE :
corrosion, 69*A*.
fracture, 47*A*.
inspection and testing, 186*A*.
manufacture, 94*A*.
tests, 46*A*.
WÖHLER DIAGRAM, amplified, 110*A*.
WORK-HARDENING, metal crystals, 60*A*.
WORKINGTON IRON & STEEL CO., Bessemer plant, 342*A*.
WROUGHT IRON, use for mine-haulage gear, 118*A*.

XALOY, 55*A*.
X-RAY EXAMINATION :
coal, 6*A*.
metals, 59*A*., 120*A*., 187*A*.
metals, secondary radiation, 305*A*.
X-RAYS, stress measurement, 241*A*., 242*A*.

Y ALLOY, frettage corrosion, 377*A*.
YIELD POINT :
mild steel, 229*A*.
new definition, 109*A*.
steel, 41*A*.
YIELD STRESS, metals at high temperatures, effect of deformation rate, 115*A*.
YORKSHIRE, history of iron making, 83*A*.

ZAPOROZHSTAL' :
blast-furnace operation, 265*A*.
electric furnace practice, 213*A*.
plant, 212*A*.
ZINC :
corrosion, effect of electrolytes, 195*A*.
density, 146*A*.
electrodeposition, 66*A*., 170*A*., 292*A*.
melting in electric furnaces, 14*A*.
spraying, 172*A*.
ZINC COATINGS :
bright, 170*A*.
corrosion, 292*A*.
effect of cadmium, 171*A*.
effect of lead, 171*A*.
effect of mercury, 171*A*.
ZIRCONIUM :
determination in iron and steel, 248*A*.
effect in steel, hydrogen attack, 126*A*.

NAME INDEX.

ABLETT, C. A., steam engineering, 474*P*.

ACHENBACH, K., malleable cast iron, 144*A*.

ADAMS, J. R., forged steel rolls, 151*A*.

ADCOCK, F., effect of nitrogen in steel, 140*P*.

AINSWORTH, R. L., action of slags on refractory materials, 325*A*.

AKSENOV, G. I., suitability of sheets for cold-pressing, 153*A*.

ALEKSEEV, P. K., "Elektrostal" Works, 149*A*.

ALEXANDROV, P., roll-pass design for blooming mills, 19*A*.

ALLEN, N. P.:
transformations in alloy steels, 374*A*.
transformations in chromium-molybdenum - nickel steel, 559*P*.

ALLEN, W. L., alloy cast iron, 115*A*.

ALLISON, A., chilled rolls, 85*A*.

ALTENHEIN, E., piping in ingots, 215*A*.

ALTENHEIN, E. F. O., coking industry of Great Britain, 204*A*.

AMADIEU, P., organisation of welding department, 30*A*.

AMBLER, J. S., elected Associate, 15*P*.

ANDERSON, A. E., mining on Mesabi Range, 200*A*.

ANDREEVA, E. I., effect of titanium and beryllium in chromium-nickel steel, 303*A*.

ANDREW, J. H.:
segregation in steel, 345*A*.
strain-ageing of steel, 421*P*.
wrought iron for mine-haulage gear, 118*A*.

ANDREW, J. H., and E. M. TRENT:
Paper.: "The Quench-Ageing of Steel." *Summary*, 509*P*. *Discussion*, 510*P*. *Correspondence*, 519*P*. *Authors' Reply*, 523*P*.

ANGLE, J. E., strip for deep-drawing, 92*A*.

ANJESKEY, A. F., conveyor for foundries, 271*A*.

ANTSIFEROV, I., scale on rolled products, 19*A*.

ANTSIFEROV, I. K., defects in rolls, 13*A*.

ARCHER, R. S.:
hardenability of steel, 296*A*.
elected Member, 13*P*.

ARENS, J., bearings for roll-necks, 277*A*.

ARLIEVSKIY, P. A., effect of sulphur-bearing gases on heat-resistant steel, 195*A*.

ARMSTRONG, C. E., elected Member, 13*P*.

ARNOLD, F. M., wear of lubricated surfaces, 232*A*.

ARNOTT, J., high-duty cast iron, 116*A*., 182*A*.

ASCOUGH, H. H., elected Member, 13*P*.

ASTAKHOV, I. S., effect of lumpiness of blast-furnace charge on gas flow, 266*A*.

ATKINS, A. H., elected Member, 13*P*.

AUSTIN, E. T., analysis of cast iron, 128*A*.

AUSTIN, J. B., decomposition of austenite at constant temperature, 63*A*.

AUVIL, H. S., swelling properties of coal, 139*A*.

AVIS, J. L., pitting of gear teeth, 304*A*.

AWBERY, J. H., total heat of steel up to 950° C., 363*A*.

BABAKOV, A. A., manganese-aluminium steel for high-frequency generators, 53*A*.

BABLIK, H., effect of aluminium in galvanising, 170*A*.

BACON, N. H.:
American open-hearth practice, 489*P*.
pyrometry, 627*P*.

BADING, W., desulphurisation of pig iron in Stürzelberg furnace, 143*A*.

BADLAM, S., rolling of sheet and strip, 278*A*.
BAERMANN, H., electrolytic zinc-plating, 170*A*.
BAILEY, E. T. W., gas-distribution system of Steel Co. of Canada, 140*A*.
BAILEY, W. H., elected Member, 13*P*.
BALDWIN, T., fatigue of tyre steel, 47*A*.
BALES, C. E., refractories for foundry ladles, 3*A*.
BALLARD, L., lubrication of rolling mills, 349*A*.
BALLAY, M.:
alloy cast iron, 116*A*.
deposition of white irons and copper-nickel-tin alloys, 301*A*.
heat-resistant nickel alloys, 302*A*.
nickel alloys for the electrical industries, 302*A*.
nickel irons for internal-combustion engines, 301*A*.
nickel and nickel-chromium steels, 302*A*.
wear of cast iron, 297*A*.
BALZ, G., spectrum analysis, 249*A*.
BANCKER, E. H., power supply for steel mills, 157*A*.
BANDEL, G., scaling and decarburisation of steel, 100*A*.
BANFIELD, T. A., dissolution of steel in sulphuric acid, 69*A*.
BARANOV, I. I., quenching media, 162*A*.
BARANOV, S. M.:
fracture test of steel, 303*A*.
silicon-manganese and silicon-chromium steel, 56*A*.
BARGER, G., protection of timber, 67*A*.
BARIGOZZI, M. M., cupola practice, 338*A*.
BARKER, F. G.:
Paper: "Some Applications of the Spectrograph to the Quantitative Analysis of Ferrous and Non-Ferrous Metals," 211*P*. *Discussion*, 246*P*. *Correspondence*, 252*P*. *Author's Reply*, 252*P*.
BARKLEY, J. F., agglomerating index of coal, 139*A*.
BARNES, R., elected Member, 13*P*.
BARRATT, W. M., elected Member, 13*P*.
BARRETT, C. S.:
structure of compressed iron, 60*A*.
structure of iron after drawing and swaging, 294*A*.
BARRETT, E. P., induction furnaces for rotating crucibles, 149*A*.
BARRETT, J. C., blast-furnace design, 336*A*.
BARRITT, R. J., coke ovens at Tata Iron and Steel Works, 333*A*.
BASCOM, F., mineral resources of Pennsylvania, 76*A*.
BASS, R. W., oil and gas resources of Oklahoma, 76*A*.
BASTIEN, P., pickling-brittleness of steel, 232*A*.
BASTIEN, P. G., effect of elements on cast iron, 180*A*.
BATES, A. A., ferrous metallurgy, 120*A*.
BAUER, H., use of rectifiers for controlling mill motors, 279*A*.
BAUKLOH, W.:
alitised coatings, 169*A*, 291*A*.
corrosion of cast iron by gases, 245*A*.
diffusion of gases in metals, 180*A*.
reaction between hydrogen and carbon in iron, 189*A*, 306*A*.
sintering of metals, 240*A*.
BEECHING, R., *X*-ray examination of coal, 6*A*.
BEENY, H. H., cutting fluids for machine tools, 31*A*.
BEER, W., malleable cast iron, 144*A*.
BEGEMAN, M. L., hard-surfacing of steel, 225*A*.
BELORUSOV, S. N., comparison of acid and basic electric steel, 90*A*.
BENAD, H., deformation-resistance and spread of material during pressing and rolling, 277*A*.
BENEDICKS, C., corrosion of iron and steel, 67*A*.
BENGOUGH, G. D., corrosion of metals by salt solutions and natural waters, 125*A*.
BENNEK, H., effect of arsenic in steel, 368*A*.
BENNETT, J. G., meeasuremnt of gas temperatures, 98*A*.
BENNETT, R. B., speech at Dinner, 30*P*.
BEREGEKOFF, D., metallographic polishing, 241*A*.
BERG, J. T., electric welding, 285*A*.
BERGEN, L. S., standardisation of stainless alloys, 239*A*.
BERGSTRÖM, H., use of charcoal in blast furnaces, 6*A*.
BERNARD, A. C., elected Member, 13*P*.

BERNARD, P., physics of metals, 370*A*.
BERNASOVSKAYA, S. A., grain-size determination, 188*A*.
BERRY, W. R., design of springs, 118*A*.
BERTELSEN, L. W., light-weight firebricks, 3*A*.
BERTHELOT, C. :
benzol recovery, 205*A*.
sulphur recovery from coke-oven gas, 139*A*.
BERTHOLD, R., electrical and magnetic tests, 120*A*.
BERTSCHINGER, R. :
law of leverage as applied to heterogeneous equilibria, 243*A*.
properties of cast iron, 301*A*.
BETTERIDGE, W. :
Paper : "Nickel-Iron-Aluminium Permanent-Magnet Alloys," 187*P*. *Correspondence*, 209*P*. *Author's Reply*, 210*P*.
BEZKHMENL'NITSKAYA, G., open-hearth process, 88*A*.
BIERT, J., corrosion of iron and steel in water, 195*A*.
BIGGE, H. C., forging and rolling of tool steel, 218*A*.
BILLINGER, R. D., early ironworks in Pennsylvania, 143*A*.
BINGHAM, R., cooling pits for castings, 272*A*.
BINNIE, D. :
ingot moulds, 632*P*.
strain-ageing of steel, 425*P*.
BISBEE, R. F., quality control of sheets, 238*A*.
BISCHOF, W., welding of high-tensile steel, 285*A*.
BLACKBURN, A. R., refractories for foundry ladles, 3*A*.
BLACKIE, A., heat transfer, 6*A*.
BLAISSE, B., measurement of temperature in high-pressure containers, 98*A*.
BLANCHET, P., nickel steel for aircraft construction, 302*A*.
BLAYDEN, H. E., W. NOBLE, and H. L. RILEY :
Paper : "The Influence of Carbonising Conditions on Coke Properties." Part II. "The Effect of Pressure, Temperature, Rate of Heating and "Soaking" on Coke Strength," 75*P*. *Discussion*, 92*P*. *Correspondence*, 95*P*. *Authors' Reply*, 97*P*.
BLOCH-SÉE, L., selection of welders, 226*A*.
BLOXDORF, W. R., wire ropes, 94*A*.
BOEGEHOLD, A. L. :
annealing of malleable castings, 85*A*.
malleable cast iron, 144*A*., 210*A*.
BOEHM, R. C., low-carbon low-alloy welded steel, 42*A*.
BOGACHEV, I. N., solution rate of graphite in cast iron, 306*A*.
BOGATZKI, G., determination of phosphorus, 128*A*.
BOHACEK, K. A., galvanising of wire, 170*A*.
BOHR, H., effect of width on cold-rolling of sheets, 19*A*.
BOILEAU, M., concentration of Lorraine ores, 77*A*.
BÖKE, W. :
alitised coatings, 169*A*., 291*A*.
BOKSHTEYN, S. Z., effect of grain size on austenite transformation in chromium-nickel steel, 62*A*.
BOLEUKH, A. S., manganese-aluminium steel for high-frequency generators, 53*A*.
BOLLENRATH, F. :
determination of stresses in tensile tests, 242*A*.
effect of decarburisation and heat-treatment on fatigue of steel stay-wires, 48*A*.
growth of cast iron, 46*A*.
heat-resistant alloys for exhaust-gas turbines, 299*A*.
weldability of sheets, 228*A*.
X-ray measurement of stress, 110*A*.
BOLOKHIVITINOV, N. F., grain-size in steel, 188*A*.
BORZDYKA, A. B., heat-resistant steel, 184*A*.
BORZDYKA, A. J., properties of steel for ammonia plant, 235*A*.
BORZDYKA, A. M., chromium-molybdenum-manganese and chromium-tungsten-manganese steels, 117*A*.
BOSANQUET, C. H., wall effect in gas temperature measurement, 98*A*.
BOSTON, O. W., power requirements of milling machine, 107*A*.
BOSTWICK, H. C., electric heat-treatment furnaces, 23*A*.
BOTH, E., creep of metals, 299*A*.
BOWEN, W., temperature-measuring instruments, 98*A*.
BOYER, J. A., effect of silicon-carbide in cast iron, 360*A*.

BOYLES, A., graphitisation of cast iron, 122*A*.
BOYNTON, A. J., stock movement in blast furnace, 11*A*.
BRADSHAW, W. N., electrodeposition of tin, 171*A*.
BRAGG, W., molecular basis of strength of materials, 121*A*.
BRAILSFORD, F., rotational hysteresis loss in steel sheets, 50*A*.
BRAMLEY, G. E. A.:
determination of oxygen in steel, 378*A*., 379*A*.
elected Associate, 15*P*.
BRANDON, F. C. effect of annealing on cold-drawn steel, 26*A*.
BRASSERT, H. A., smelting of fine ores, 207*A*., 266*A*., 337*A*.
BRAUN, M., phosphorus-bearing steel, 194*A*.
BRAUN, M. P., low-alloy steels, 239*A*.
BRAZENALL, W., heat treatment of steel, 223*A*.
BREITFELD, H., determination of damping, 48*A*.
BREMER, P., coal-tar pitch for carburetting gas, 141*A*.
BREWER, R. E., carbonising properties of coal, 139*A*.
BRIGGS, C. W., design of steel castings, 271*A*.
BRION, H. C., heat treatment of piston rings, 24*A*.
BRISTOW, C. A., iron-nickel diagram, 375*A*.
BROOKE, J. B. R.:
American open-hearth practice, 485*P*.
ingot moulds, 635*P*.
BROWN, G. M., electric-furnace practice, 500*P*.
BROWN, SIR HAROLD A., speech at Dinner, 35*P*.
BROWN, R. J., control of heat-treatment operations, 160*A*.
BROWN, W. T., swelling properties of coal, 334*A*.
BRUCE, E. L., mineral deposits of Ukraine and Urals, 76*A*.
BRÜCKNER, F., structure of galvanised sheets, 123*A*.
BRÜGGER, F., malleable cast iron, 236*A*.
BRÜHL, E., relation between coke consumption and flue-gas composition in cupolas, 269*A*.
BRUHN, H., lead in cast iron, 236*A*.
BRYLKIN, S. D., roll pressures, 95*A*.
BRYSCH, O. P., combustion of fuel, 331*A*.
BUCHANAN, J., elected Member, 13*P*.
BUCHANAN, W. Y., moulding of lathe bed, 146*A*.
BUCKNALL, E. H.:
heating and cooling curves of steel, 373*A*.
inverse-rate curves, 560*P*.
thermal curves, 177*P*.
BUKALSKI, A., tests of cast and rolled materials, 173*A*.
BUMM, H.:
relation between precipitation processes and magnetic hardness of alloys, 113*A*.
segregation in iron-copper-nickel alloys, 243*A*.
BUNGARDT, K., growth of cast iron, 46*A*.
BUNGADRT, W.:
effect of decarburisation and heat treatment on fatigue of steel stay-wires, 48*A*.
heat-resistant alloys for exhaust-gas turbines, 299*A*.
BURDICK, L. R., agglomerating index of coal, 139*A*.
BURGESS, C. O., alloy cast iron, 368*A*.
BURGSDORF, I. V., surface-hardening, 282*A*.
BURR, W. H., developments in iron and steel industry, 273*A*.
BURRELL, T. L., coiling of strip, 279*A*.
BURSUK, A., determination of copper, 128*A*.
BURTON, H. H.:
pyrometry, 623*P*., 625*P*.
quench-ageing of steel, 512*P*., 517*P*.
BURWELL, J. T., transformation in stainless steel induced by polishing, 305*A*.
BUSCH, H., structure of annealed welds in boiler plate, 286*A*.
BÜTTINGHAUS, A., iron-titanium-carbon alloys, 244*A*.

CAMERON, J. JUN., production of castings from shell patterns, 339*A*.
CAMPBELL, A. M., gating and feeding of castings, 85*A*.
CAMPBELL, D. F.:
Paper: "Electric Furnaces in European Steelworks," *Summary*, 495*P*. *Discussion*, 496*P*. *Author's Reply*, 506*P*.
CAMPBELL, T. C.:
sheet and strip mills, 222*A*.

CAMPBELL, T. C. (*contd.*)—
small-scale plant of Jones and Laughlin Steel Corporation, 41*A*.
CAPPER, A. M., flames for industrial heating, 22*A*.
CARNEGIE, H. S., electric driving of rolling mills, 97*A*., 351*A*.
CAWLEY, F. B., acid-Bessemer process, 342*A*.
CHADEYRON, A. A.:
chrome-magnesite-dolomite mixtures, 321*A*.
tridymitisation of silica bricks, 322*A*.
CHAISE, G. DE LA, stresses in autofrettage tubes, 46*A*.
CHALLONER, A. R., coefficient of expansion of steel, 363*A*.
CHALMERS, B., metal crystals, 60*A*.
CHARD, J. E., elected Associate, 15*P*.
CHARLIER, P. T. R., elected Member, 13*P*.
CHARPENTIER, elected Member, 13*P*.
CHATFIELD, LORD, speech at Dinner, 19*P*.
CHAUDHURI, R. N., fissures in rails, 175*A*.
CHAURAND, R., burning of surplus blast-furnace gas, 206*A*.
CHAVY, R.:
deposition of white irons and copper-nickel-tin alloys, 301*A*.
nickel irons for internal-combustion engines, 301*A*.
CHERNASHKIN, V. G., properties of alloy steel, 55*A*.
CHÉRON, E., chromium steel for rollers, 240*A*.
CHESTERS, J. H.:
firebricks for iron and steel works, 262*A*.
elected Member, 13*P*.
CHEVENARD, P., use of physical chemistry for study of alloys, 305*A*.
CHIA, K. S., low-temperature carbonisation, 205*A*.
CHIPMAN, J., solidification of rimming-steel ingots, 149*A*.
CHUBB, W. F., colour photomicrography, 370*A*.
CHUDKOVSKAYA, L. A., effect of copper on nickel-aluminium steel, 179*A*.
CHURCHER, B. G., electrical and magnetic tests, 120*A*.
CLARK, C. L.:
acceptability tests of steel for high-temperature characteristics, 53*A*.
creep tests of carbon steel, 45*A*.
low-alloy pearlitic steel for high-temperatures, 117*A*.
CLARK, R. W., welded molybdenum-steel pipes, 228*A*.
CLARKE, L., hydrogenation of coal, 335*A*.
CLAUSSEN, G. E.:
corrosion-resistance of welded steel, 287*A*.
effect of sulphur on welding of steel, 358*A*.
impact tests of welded joints, 42*A*.
welding of coated steel, 357*A*.
welding of molybdenum steel, 165*A*.
welding of silicon steel, 28*A*.
CLAUSSET, A., blast-furnace linings, 262*A*.
CLEWS, F. H.:
action of alkalis on refractory materials, 325*A*., 326*A*., 327*A*.
jointing cements, 327*A*., 328*A*.
refractoriness-under-load tests, 328*A*., 329*A*.
CLINEDINST, W. O., fatigue of roller bearings, 112*A*.
COBB, J. W., scaling of steel, 353*A*.
COBERLY, C. J., wear of lubricated surfaces, 232*A*.
COLBECK, E. W.:
analysis of chlorine residues, 382*A*.
analysis of non-metallic residues from steel, 382*A*.
determination of inclusions, 380*A*.
COLBECK, E. W., and R. P. GARNER:
Paper: "The Effect of Nitrogen Additions and Heat Treatment on the Properties of High-Chromium Steels," 99*P*. *Correspondence*, 137*P*. *Authors' Reply*, 144*P*.
COLBY, L., handling of foundry sand, 15*A*.
COMSTOCK, G. F.:
effect of titanium and silicon in cast iron, 115*A*.
effect of titanium and vanadium in iron and steel, 367*A*.
titanium, 182*A*.
CONE, E. F.:
centrifugal casting of gear blanks, 85*A*.
low-alloy steels, 117*A*.

CONLEY, W., hardness variations in heat-treated parts, 232*A*.
CONLEY, W. J., tests of welds, 105*A*.
CONNOR, E. D., determination of hardness, 48*A*.
CONRADI, L. C., heat treatment by high-frequency induction, 23*A*.
COOPER, L. R., troostite and sorbite, 58*A*.
COOPER, W. E., elected Member, 13*P*.
CORNELIUS, H.:
fatigue-strength of welded chromium-molybdenum steel tubes, 227*A*.
heat-resistant alloys for exhaust-gas turbines, 299*A*.
weldability of sheets, 228*A*.
COTTY, M., wire-drawing practice, 153*A*.
COUTANT, J. G.:
heat control in annealing furnaces, 24*A*.
recuperators, 203*A*.
COX, G. L., corrosion of metals in soap industry, 246*A*.
COX, J. W., elected Member, 13*P*.
CRAIG, D., elected Member, 13*P*.
CRAIG, H. S., elected Member, 13*P*.
CRAVEN, S. W.:
analysis of chlorine residues, 382*A*.
analysis of non-metallic residues from steel, 382*A*.
determination of inclusions, 380*A*.
CRAWFORD, C. W. J., elected Associate, 15*P*.
CROOKSHANK, H., iron ore in India, 316*A*.
CROSBY, V. A., high-duty cast iron, 237*A*.
CROSS, H. C.:
creep resistance of steel, 44*A*.
creep tests of carbon steel, 45*A*.
CROWLE, R. S., elected Member, 13*P*.
CUTHBERTSON, G. A., early Canadian blast-furnace, 208*A*.

DAEVES, K.:
drop-forging of steel and light metals, 152*A*.
life of galvanised coatings, 170*A*.
tests of materials, 173*A*.
D'AMICO, C. D., austenite transformation in grey iron, 307*A*.
DANFORTH, G. L., JUN., open-hearth furnaces, 212*A*.
DANIEL, J. L., elected Member, 13*P*.
DANNÖHL, W.:
hardness and magnetic properties of iron-copper-molybdenum alloys, 296*A*.
DANNÖHL, W. (*contd.*)—
iron-copper-molybdenum alloys, 244*A*.
DARNIELLE, R. B., corrosiveness of soils, 245*A*.
DARSEY, V. M., effect of corrosion on paint films, 40*A*.
DAVIDENKOFF, N., impact tests, 230*A*.
DAVIES, C. E., rolling of strip, 157*A*.
DAVIES, D. T., coal preparation, 332*A*.
DAVIES, J. A.:
American open-hearth practice, 481*P*.
ingot moulds, 633*P*.
DAVIS, E. A.:
constant-strain-rate tests on steel, 115*A*.
effect of loading rate on elongation of steel, 230*A*.
DAVIS, J. D.:
carbonising properties of coal, 139*A*., 334*A*.
swelling properties of coal, 139*A*.
DAWSON, H. H., growth and scaling of cast iron, 182*A*.
DEAKIN, J. B., soaking pits, 528*P*.
DEAR, P. S., slag attack on ladle linings, 263*A*.
DEARDEN, J., effect of moisture on moulding sands, 270*A*.
DEMING, G. M., oxygen cutting, 106*A*.
DEN HARTOG, J. P., effect of residual stress on welded seams, 166*A*.
DENIG, F., coke-oven design, 9*A*.
DENISON, A. C., high-duty cast iron, 237*A*.
DENISON, I. A., corrosiveness of soils, 245*A*.
DENISOV, P., effect of elements on magnetic properties of iron-nickel-aluminium alloys, 178*A*.
DERGE, G., hardness of metals, 177*A*.
DESCH, C. H.:
delta region in carbon steel, 373*A*.
determination of oxygen, 622*P*.
intercrystalline cracking of boiler plates, 231*A*., 376*A*.
spectrum analysis, 246*P*.
transformations in alloy steel, 563*P*.
DE SY, A. L., elected Member, 14*P*.
DICK, P., rolling of blooms, 156*A*.
DICKENS, P.:
pickling of steel, 168*A*.
recovery of laboratory reagents, 249*A*.

DICKIE, H. A., properties of steel, 360*A*.
DIEPSCHLAG, E., behaviour of manganese in steel manufacture, 148*A*.
DIERGARTEN, H.:
metallography, 187*A*.
preparation of metallographic specimens, 305*A*.
DIERKER, A. H.:
growth and scaling of cast iron, 182*A*.
wear of metals in clay-working machines, 297*A*.
DIES, K., wear of metals, 361*A*.
DIETERT, H. W., moulding sands for steel castings, 84*A*.
DIGGES, T. G., effect of carbon on critical-cooling-rate of iron-carbon alloys, 191*A*.
DILLARD, W. R., oil and gas resources of Oklahoma, 76*A*.
DIX, H., pressure-gas-firing of furnaces, 140*A*.
DOAN, G. E. crater formation in arc welding, 103*A*.
DODD, A. E.:
refractories for basic open-hearth furnaces, 318*A*.
refractoriness - under - load of chrome-magnesite bricks, 78*A*.
DOLAN, T. J., effect of corrosion on fatigue strength of steel, 231*A*.
DONALDSON, A. R., design of steel castings, 271*A*.
DONNELL, L. H., proportional limit and yield point, 109*A*.
DONOHO, C. K.:
blast pressure in cupolas, 269*A*.
effect of cupola practice on linings, 269*A*.
DONTSOV, P. M., effect of heat treatment on cold-rolled steel sheets, 62*A*.
DOREY, S. F., non-destructive tests, 120*A*.
DÖRING, A., behaviour of sulphuric acid in pickling of strip, 33*A*.
DOROGOV, N. I., foundry at Lenmetallurgstroy Works, 13*A*.
DOROGOV, S., oil-quenching media, 27*A*.
DOUCHEMENT, J. S., elected Member, 14*P*.
DOUGHERTY, R. S. A., elected Member, 14*P*.
DOVEL, J. P., hot-blast stoves, 82*A*.
DOVGALEVSKIY, YA.:
effect of low temperature on quenched steel, 63*A*.
DOVGALEVSKIY, YA. (*contd.*)—
low-tungsten high-speed steel, 185*A*.
DRAKE, H. C., welding of rails, 103*A*.
DRATH, M. A., molybdenum, 317*A*.
DREYFUS L., high-frequency furnaces, 213*A*.
DRONIN, V. M., chromium-nickel case-hardening steel, 184*A*.
DRUMMOND, J. C.:
history of canning industry, 70*A*.
tinned foods of historical interest, 70*A*.
DRUZHKOV, A. A., defects in strip, 97*A*.
DUDAR, A., manufacture of medium-carbon steel, 17*A*.
DUDLEY, EARL OF., speech at Dinner, 25*P*.
DUDOUET, M., cupola practice, 270*A*.
DUDOVTSEV, T. A., austenite transformation in chromium-nickel steel, 192*A*.
DUFTY, N. F., history of iron, 268*A*.
DUMA, J. A., defects in steel 43*A*., 195*A*.
DUNNINGHAM, A. C., swelling of coal during combustion, 138*A*.
DUPARQUE, A., chemistry and petrography of coal seams, 80*A*.
DUPEN, C., temperature-control instruments, 6*A*.
DURER, A., measurement of heat energy in metallurgical investigations, 53*A*.
DURRER, R., iron making in Switzerland, 12*A*.
DURVILLE G., Durville casting process, 310*P*.
DURVILLE, P., Durville casting process, 310*P*.
DWYER, P., foundry of General Motor Corporation, 146*A*.

ECKEL, E. B., iron ore in Texas, 316*A*.
EDGERTON, C. T., helical springs, 111*A*.
EDQVIST, K., electrode control in arc furnaces, 213*A*.
EDWARDS, A., nickel-iron-aluminium permanent-magnet alloys, 209*P*.
EDWARDS, C. A., segregation in steel, 601*P*.

EDWARDS, C. A., H. N. JONES, and B. WALTERS :
Paper : " A Study of ' Strain-Age-Hardening ' of Mild Steel," 341*P*. *Discussion*, 419*P*. *Correspondence*, 428*P*. *Authors' Reply*, 429*P*.
EDWARDS, E., elected Member, 14*P*.
EFIMOV, A. P., manufacture of tool steel in electric furnaces, 89*A*.
EGGERS, H. :
iron-niobium-carbon diagram, 65*A*., 243*A*.
iron-niobium diagram 65*A*.
EICHLER, H., automobile steels, 160*A*.
EISENMANN, G., use of gas in Germany, 264*A*.
EISERMANN, F. :
determination of vanadium, 128*A*.
vanadium-bearing slags for production of ferro-vanadium, 142*A*.
EISNER, A., hydrogenation of coal, 335*A*.
ELLERTON, H., blast-furnace linings, 323*A*.
ELLISS, H., gases in steel, 180*A*.
ELSSNER, G., electrolytic tinning and zincing of steel, 170*A*.
EMERSON, R. W., weldability of carbon steel, 105*A*.
EMICKE, O., deformation-resistance and spread of material during rolling and pressing, 277*A*.
ENGEL, L., rolling-mill drives, 279*A*.
ENGEL, N., surface reaction method of steel production, 274*A*.
ENGEL, W., surface reaction method of steel production, 274*A*.
ERAKHTIN, V. :
chromium - tungsten - silicon and chromium-silicon steels, 57*A*.
tungsten magnet steel, 234*A*.
ERAKHTIN, V. A. :
chromium magnet steel, 234*A*.
chromium-nickel and chromium-nickel-tungsten steels, 239*A*.
chromium-silicon steel, 185*A*.
chromium-tungsten-silicon steel, 56*A*.
magnetic properties of chromium-cobalt-molybdenum steel, 113*A*.
magnetic properties of chromium-tungsten and chromium-molybdenum steel, 51*A*.
properties of chromal, 43*A*.
ERGANG, R. :
iron - chromium - nickel diagram, 307*A*.
iron-niobium diagram, 65*A*.
ERHARD, W., preparation of metallographic specimens, 305*A*.
ERIKSEN, E. L., stresses in welded pipes, 105*A*.
ERKER, A., bend-fatigue strength of welds, 167*A*.
ERLINGER, E., fatigue-testing machine, 360*A*.
ESCHER, H. :
Paper : " Ten Years' Development in Steam Engineering at the Port Kembla Steelworks, N.S.W., Australia," 443*P*. *Discussion*, 474*P*. *Correspondence*, 475*P*. *Author's Reply*, 476*P*.
awarded Ablett Prize, 16*P*.
ESFELD, G., bar mills, 350*A*.
EVANS, B. S. :
determination of tellurium, 248*A*.
determination of vanadium, 248*A*.
EVANS, E. C. :
pressure of coke during carbonisation, 94*P*.
research in Great Britain, 229*A*.
EVANS, G. S. :
desulphurisation of cast iron, 209*A*.
desulphurisation of pig iron, 10*A*., 11*A*.
EVANS, T., effect of carbonising conditions on coke properties, 95*P*.
EVANS, U. R. :
corrosion of metals by salt solutions and natural waters, 125*A*.
corrosion of metals in water, 68*A*.
corrosion-fatigue, 377*A*.
priming paints without oil vehicles, 245*A*.
scaling of steel in presence of sulphur compounds, 549*P*.
EVEREST, A. B., nickel cast-iron, 54*A*.
EVERETT, L. E., foundry of Key Co., 340*A*.
EVERHART, J. O., wear of metals in clay-working machines, 297*A*.

FAENSEN, H., planning department of steelworks, 16*A*.
FAHR, K., malleable cast-iron, 144*A*.
FAIR, F. C., tests of alloy-steel welds, 42*A*.
FAIRBAIRN, G. F., metal spraying, 38*A*.
FARCY, H., stelliting of metals, 227*A*.
FARNIK, A., properties of corrosion- and heat-resistant steels at high temperature, 365*A*.

FARNWORTH, W. M., and E. R. JOHNSON :
Paper : "American Electric-Furnace Practice." *Summary*, 495*P*. *Discussion*, 496*P*. *Authors' Reply*, 505*P*.
FARRAR, M. G., propane for carburisation, 281*A*.
FAULKINER, E., Kembla Works of Australian Iron and Steel, Ltd., 221*A*.
FAULKNER, V. C., foundry of S. Russell & Sons, Ltd., 14*A*.
FAUST, E., reduction of silicon and titanium in blast-furnace, 266*A*.
FEDOROV, A. F., steel for valve springs, 56*A*.
FELIX, W., pearlitic malleable cast-iron, 63*A*.
FESZCZENCKO-CZOPIWSKI, I. :
effect of titanium and molybdenum on magnetic properties of iron-nickel-aluminium alloys, 52*A*.
effect of vanadium in steel, 306*A*.
heat treatment of deformation-resistant steel, 354*A*.
iron-aluminium-nickel alloys for permanent magnets, 362*A*.
primary austenite grains in steel, 372*A*.
properties of plates at high temperatures, 366*A*.
tests of quenching media, 356*A*.
FETISOV, S., rimming steel for boiler plates, 275*A*.
FETTERS, K. L., elected Associate, 15*P*.
FIELDER, R. G., elected Member, 14*P*.
FIELDNER, A. C. :
carbonising properties of coal, 139*A*, 334*A*.
coal preparation, 7*A*.
sampling and analysis of coal, 129*A*.
FILIPYCHEVA, F., grain-size control of alloy steel, 123*A*.
FINCH, G. A., elected Associate, 15*P*.
FINDLEY, J. K. :
annealing of stainless wire, 225*A*.
stainless steel wire, 94*A*.
FINK, C. G., aluminium-coated steel wire, 169*A*.
FINKEY, J. :
coal preparation, 204*A*.
Finkey–Baumert coal-separation plant, 204*A*.
FISCHER, H., electrolytic zinc-plating, 170*A*.
FISCHER, M., electric driving of rolling mills, 278*A*.
FISHENDEN, M. :
measurement of gas temperatures, 98*A*.
thermocouples, 352*A*.
FISHER, A., spectrum analysis, 384*A*.
FISHER, A. J., oil burning, 141*A*.
FISHER, C. H., hydrogenation of coal, 335*A*.
FLEMING, A. P. M., electrical and magnetic tests, 120*A*.
FLETCHER, J. R., internal stresses in butt-welded plate, 166*A*.
FORBES, D. P., spheroidised pearlitic malleable cast-iron, 121*A*., 370*A*.
FORD, W. F., refractoriness-under-load test, 329*A*.
FORGENG, W. D., metallographic polishing, 241*A*.
FÖRSTER, F. :
determination of damping, 48*A*.
modules of elasticity and damping, 120*A*.
FÖRSTER, M., rolling-mill practice, 277*A*.
FOULON, A., protective coatings, 290*A*.
FOX, F., powder metallurgy, 186*A*.
FOX, F. A., tool steels, 31*A*.
FOXWELL, G. E. :
by-product coking, 264*A*.
pressure of coke during carbonisation, 92*P*.
FRANCIS, J. L., cast iron for engineering construction, 54*A*., 236*A*.
FRANCIS, W., determination of sulphur dioxide in gases, 249*A*.
FRANKLIN, F. F., inclusions in steel, 180*A*., 235*A*.
FRANKS, R., effect of nitrogen in chromium steel, 140*P*.
FRERICH, R., refining action in basic converter, 16*A*.
FREYDEL', M. S., manganese steel for boilers, 185*A*.
FRIDMAN, YA. B., ageing of austenitic steel, 49*A*.
FRIEND, J. NEWTON, corrosion of iron and steel, 67*A*.
FRITZ, G., forging machines, 217*A*.
FUKUI, S., deep-drawing, 219*A*.
FUKUSIMA, M., absorption of hydrogen and nitrogen by pure iron, 54*A*.

GAEV, I. S., control of steel heats, 147*A*.
GALE, B., machine moulding, 210*A*.

GALIBOURG, J.:
chromium-nickel steel, 303*A*.
nickel-steel castings, 302*A*.
nickel steel for railway rolling stock, 302*A*.
properties of nickel steels at high temperatures, 302*A*.
GALL, D. C., measurement of incremental permeability, 50*A*.
GALLAY, YA. S.:
effect of surface finish and design of rolls on steel strip, 20*A*.
lubricants for cold-rolling, 156*A*.
GAMLEN, H., corrosion of boilers, 127*A*.
GARNER, R. P.:
Paper: "The Effect of Nitrogen Additions and Heat Treatment on the Properties of High-Chromium Steels." *See* COLBECK, E. W.
GATTERER, A.:
determination of carbon in iron, 383*A*.
spectroscopically pure iron, 384*A*.
GAUDRY, H., measurement of flame temperatures, 98*A*.
GAZEZ'YAN, A. N., chromium-manganese steel, 183*A*.
GEBHARD, K., cold-rolling, 351*A*.
GEIGER, J., determination of vibratory stresses in shafts, 177*A*.
GEILENKIRCHEN, T., German foundry practice, 209*A*.
GEISSEL, A., durability of cast iron kettles, 125*A*.
GERBER, J. S., elected Member, 14*P*.
GERLACH, W., spectrum analysis, 129*A*.
GESSNER, O., awarded Carnegie Research Grant, 37*P*.
GEZELIUS, R. A., design of steel castings, 271*A*.
GIBSON, G. J., shrinkage of welds, 166*A*.
GILBERT, W. W., power requirements of milling machine, 107*A*.
GILBERTSON, L. I., silverplating of steel, 36*A*.
GILLET, A. C., constitution of coals, 138*A*.
GILLETT, H. W., corrosion-resistant alloys, 66*A*.
GILLHAM, E. W. F., determination of sulphur dioxide in gases, 249*A*.
GILLIES, F. M., and E. D. MARTIN:
Paper: "American Soaking-Pit and Reheating-Furnace Design and Practice." *Summary*, 527*P*. *Discussion*, 528*P*. *Correspondence*, 532*P*.
GINTSBURG, YA. S.:
effect of grain size on carbon steel, 185*A*.
manganese steel for boilers, 185*A*.
rolling of alloy steel in Russia, 156*A*.
GINWALA, SIR P. P., elected Member, 14*P*.
GISEN, F., effect of time on internal stresses in alternating bend tests, 42*A*.
GLATMAN, J., properties of plates at high temperatures, 366*A*.
GLOCKER, R., effect of time on internal stresses in alternating bend tests, 42*A*.
GNADE, R., pearlitic malleable cast-iron, 63*A*.
GOELZER, A., photo-electric measurement of stress, 167*A*.
GOLDOWSKI, N., Laboratory equipment of Institut für chemische Technologie anorganische Stoffe, 41*A*.
GOLIKOV, I., high-speed tungsten steel, 101*A*.
GOLIKOV, I. N.:
grain-size control of alloy steel, 123*A*.
grain-size determination, 188*A*.
grain size and properties of tool steel, 62*A*.
GORBUNOV, A., low-tungsten high-speed steel, 185*A*.
GORDON, R. M., lubrication of rolling mills, 156*A*.
GÖTTE, A., coal preparation, 203A.
GOTTSCHALK, E., fits and tolerances, 288*A*.
GÖTZL, F., effect of aluminium in galvanising, 170*A*.
GOUGH, H. J., frettage corrosion, 377*A*.
GOULD, A. J., corrosion-fatigue, 377*A*.
GOURDON, R., erosion of metals, 297*A*.
GRAAF, J. E. DE, radiography, 120*A*.
GRACE, A., "quick-immersion" thermocouples, 352*A*.
GRAEF, O. K., bearings for rolling-mills, 220*A*.
GRAF, O., fatigue of welded rails, 167*A*.
GRAHAM, C. S., steelworks refractories, 658*P*.
GRAY, N., determination of oxygen in steel, 379*A*.
GREEN, A. T.:
action of alkalis on refractory materials, 325*A*., 326*A*., 327*A*.

GREEN, A. T. (*contd.*)—
action of slags on refractory materials, 324*A*., 325*A*.
blast-furnace linings, 323*A*.
durability of chrome-magnesite bricks in basic open-hearth furnaces, 322*A*.
jointing cements, 327*A*., 328*A*.
refractories for basic open-hearth furnaces, 318*A*.
refractoriness-under-load test, 328*A*, 329*A*.
refractory materials, 654*P*.
thermal expansion of refractories, 2*A*.
GREEN, V. E., tests of materials, 294*A*.
GREENAWALT, J. E., sintering process, 77*A*.
GREENE, C. F., effect of cupola practice on linings, 269*A*.
GREENWOOD, THE RT. HON. VISCOUNT:
elected Member, 14*P*.
speech at Dinner, 28*P*.
GREETHAM, T., elected Member, 14*P*.
GREGORY, E., segregation in steel, 606*P*.
GREINER, A. T., forced-convection furnaces, 22*A*.
GREINER, L., speech at Dinner, 33*P*.
GREULICH, E., degreasing of steel, 168*A*.
GREY-DAVIES, T., open-hearth practice, 212*A*.
GREY-DAVIES, T. G., American open-hearth practice, 489*P*.
GRIFFITHS, EZER, thermal conductivity of quenching oil, 355*A*.
GRIFFITHS, W. T., transformations in alloy steels, 374*A*.
GRIGOROV, K. V., suitability of sheets for cold-pressing, 153*A*.
GRIGOROVICH, K. P.:
development of alloy steel, 55*A*.
Russian alloy steel industry, 147*A*.
GRINGAUS, D. A., nickel-aluminium magnet steel, 112*A*.
GROOM, E. J., galvanising, 37*A*.
GROSS, H., effect of annealing on hardness of chromium steel, 296*A*.
GRUBITSCH, H., structure of galvanised sheets, 123*A*.
GRUMELL, E. S., swelling of coal during combustion, 138*A*.
GUERKE, R. M., measurement of vibratory stresses, 112*A*.
GUILLAUME, C. E., magnetic properties of nickel steel, 303*A*.
GUILLET, L.:
killed and effervescing steels, 215*A*.
quench-ageing, 162*A*.
GUILLET, L., jun., effect of elements on cast iron, 180*A*.
GULYAEV, A. P.:
grain-size in high-speed steel, 188*A*.
tempering of silchrome, 102*A*.
GUTHMANN, K., use of blast-furnace gas, 81*A*.
GUY, T. W., determination of surface moisture in coal, 7*A*.

HAARMANN, R., galvanising of steel, 170*A*.
HABART, H., failure of refinery tubes, 231*A*.
HABIB, R., corrosion of high-pressure boiler, 68*A*.
HACKING, R. A., segregation in steel, 628*P*.
HADFIELD, SIR ROBERT A., nitrided manganese steel, 67*A*.
HALLS, E. E., phosphatising steel prior to enamelling, 293*A*.
HAMMERSTEIN, H. K., tests of wire rope, 46*A*.
HAMPSHIRE, E. L., elected Member, 14*P*.
HANDFORD, C., thermal curves, 177*P*.
HANEMANN, H.:
graphitisation of cast iron, 122*A*.
structure and tensile strength of cast iron, 116*A*.
HARBORD, F. W., spectrum analysis, 247*P*.
HARDERS, F.:
refractory bricks, 2*A*.
refractory materials, 262*A*.
HARRINGTON, R. H., resistance welding electrodes, 104*A*.
HARRIS, H., metallurgy of welding, 104*A*.
HARRIS, H. H., tests of welded pressure vessels, 286*A*.
HARRISON, R. E. W., drop forging, 347*A*.
HARRY, R. G., elected Member, 14*P*.
HARTENBERG, R. S., effect of form and scale on strength, 174*A*.
HATFIELD, W. H.:
corrosion- and heat-resistant steel, 183*A*.
Durville casting process, 367*P*.
electric-furnace practice, 498*P*.
embrittlement of steel, 420*P*.
nickel-chromium-molybdenum-vanadium steel ingot, 375*A*.

HATFIELD, W. H. (*contd.*)—
quench-ageing of steel, 516*P*, 518*P*.
research in iron and steel industry, 229*A*.
spectrum analysis, 247*P*.
HAUK, V., determination of stresses in tensile tests, 242*A*.
HAVEN, W. A., blast-furnace practice, 265*A*.
HAWKINS, G. A., oxidation of metals by steam, 127*A*.
HAWTHORNE, W. R., measurement of gas temperatures, 98*A*.
HAYES, A., solidification of rimming steel ingots, 149*A*.
HAYS, F. N., control instruments for blast-furnaces, 142*A*.
HEINDLHOFER, aspirating thermo-couple for gas temperatures, 98*A*.
HELBIG, W. A., use of activated carbon in electroplating, 290*A*.
HEMPEL, M.:
chromium - molybdenum steel, 369*A*.
fatigue testing and crystal structure, 47*A*., 295*A*.
HENDERSON, H. M., remarks on Gillies and Martin's paper, 529*P*.
HENDERSON, J.:
awarded Bessemer Gold Medal, 9*P*.
remarks on Wilson's paper, 337*P*.
Treasurer's Report, 7*P*.
HENGST, J. H., oil and gas resources of Oklahoma, 76*A*.
HENKE, G., sintering of metals, 240*A*.
HÉNON, G., moulding sands, 84*A*.
HERASYMENKO, P.:
physical chemistry of basic-open-hearth process, 282*P*.
slag/metal equilibria, 88*A*.
HERBST, H.:
corrosion of wire ropes, 69*A*.
internal fractures in wire ropes, 47*A*.
HERINGTON, C. F., pulverised coal, 333*A*.
HERMANN, C. C., cleaning of castings, 340*A*.
HERVIG, V., fractured rails on German State Railways, 46*A*.
HERZIG, A. J., high-duty cast iron, 237*A*.
HERZOG, E.:
corrosion of steel by nitrate, 127*A*.
heat-treatment of steel in neutral atmospheres, 22*A*.
HESELWOOD, W. C., specific heat of quenching oils, 355*A*.
HESS, W. F., spot welding of steel, 104*A*.
HEUGEL, E., coal and ore in Sudetenland, 199*A*.
HEUSSNER, C. E., metallic coatings, 66*A*.
HEWITT, L. C., refractory mortars for foundries, 2*A*.
HEYL, L., elected Member, 14*P*.
HEYROVSKY, J., polarography, 248*A*.
HIBBARD, H. D., freezing of rimming steel, 91*A*.
HICKMAN, M. J., thermal conductivity and electrical resistivity of steel, 364*A*.
HINCKLEY, G. P., elected Member, 14*P*.
HIRSCH, W. F., nickel-boron cast iron, 55*A*.
HITCHCOCK, J. O., iron-chromium-nickel alloys, 183*A*.
HOAR, T. P.:
corrosion of metals by salt solutions and natural waters, 125*A*.
protection of metal surfaces, 290*A*.
HOARE, W. E., discontinuities in tin coatings, 292*A*.
HOBSON, W., corrugation of rails, 240*A*.
HOCK, A. G., action of fluorspar in basic open-hearth furnace, 281*P*.
HODGSON, C. C., wear of cast iron and malleable iron, 232*A*.
HOFMANN, L., malleable cast iron, 144*A*.
HÖGEL, L., electric heat-treatment furnaces, 161*A*.
HÖHLE, H., spread of metal in rolling wire, 19*A*.
HOLBROOK, W. F., induction furnaces for rotating crucibles, 149*A*.
HOLE, I., electric-smelting furnaces, 268*A*.
HOLLINGS, J. S., soaking pits, 531*P*.
HOLLIS, J. B., elected Associate, 15*P*.
HOLMAN, B., strength of moulding sand, 145*A*.
HOLMES, C. R., carbonising properties of coal, 334*A*.
HOLMQUIST, H. O. E., elected Member, 14*P*.
HOLT, G. J., mining on Mesabi Range, 200*A*.
HOLZHAUER, C., corrosion-resistance of welded steel, 287*A*.
HOMBORG, E., use of gas in Germany, 264*A*.
HOMERBERG, V. O., nitriding, 100*A*.

HOPKINS, C. H., thermal expansion of iron-nickel alloys, 179*A*.
HOPKINS, H. L., cold-heading, 93*A*.
HORTON, S. A., pattern-making, 339*A*.
HORWOOD, H. E., gas-cutting, 106*A*.
HOTHERSALL, A. W.:
electrodeposition of tin, 171*A*.
electroplating of tinplate, 171*A*.
nickel and chromium plating of tinplate, 35*A*.
HOUDREMONT, E.:
development in alloy steels, 238*A*.
effect of aluminium in steel, 300*A*.
effect of arsenic in steel, 368*A*.
high-quality steels, 54*A*.
metallurgical problems in Germany, 83*A*.
HOWIE, T. W., firebricks for iron and steel works, 262*A*.
HOYT, S. L., impact tests, 230*A*.
HUDSON, J. C.:
corrosion-fatigue, 581*P*.
dissolution of steel in sulphuric acid, 69*A*.
protection of steel by paints, 39*A*.
scaling of steel, 570*P*.
HUFFMAN, W. D., cutting fluids, 31*A*.
HUGILL, W:
action of slags on refractory materials, 324*A*., 325*A*.
blast-furnace linings, 323*A*.
durability of chrome-magnesite bricks in basic open-hearth furnaces, 322*A*.
synthetic spinels, 322*A*.
HULTGREN, A., solidification of rimming steel ingots, 214*A*.
HURST, J. E.:
cast iron, 123*A*.
metallic abrasives, 168*A*.
nitriding of cast iron, 353*A*.
properties of cast iron, 116*A*.
use of metallic abrasives for cleaning castings, 39*A*.
HURST, J. H., forging practice, 92*A*.
HSU, T-S., elected Member, 14*P*.
HYSLOP, J. F., refractory materials, 262*A*.

IITAKA, I., fracture of cast iron, 109*A*.
IL'INSKIY, B., air cooling in rolling-mill shops, 158*A*.
IMHOFF, W. G., galvanising practice, 170*A*., 291*A*.
INDEN, P., Fretz-Moon process, 164*A*.
IVANOV, M. E.:
manufacture of tool steel, 118*A*.
manufacture of tool steel in electric furnaces, 89*A*.
IVANOV, O., effect of low temperature on quenched steel, 63*A*.
IVERSEN, L., slabbing-blooming mills, 278*A*.
IWANOW, P. N., basicity of slag in open-hearth practice, 212*A*.
IWASÉ, K., absorption of hydrogen and nitrogen by pure iron, 54*A*.
IWATA, T., elected Member, 14*P*.

JACKSON, A., ingot moulds, 636*P*.
JACKSON, J. A., cranes for steel mills, 21*A*.
JACKSON, J. W., insulating bricks, 79*A*.
JACKSON, R.:
effect of high-frequency currents on steel, 362*A*.
electron-diffraction study of oxide films, 371*A*.
JAMISON, J. A., corrosion of oil-refinery equipment, 376*A*.
JANITZKY, E. J., machinability of steel, 288*A*.
JASPER, T. M., properties of steel at high temperatures, 365*A*.
JAY, A. H.:
delta region of iron-nickel system, 567*P*.
quench-ageing of steel, 514*P*.
spectrum analysis, 250*P*.
transformations in iron-cobalt alloys, 577*P*.
X-ray examination of non-metallic residues, 383*A*.
JENKIN, J. W., scaling of steel, 547*P*., 572*P*.
JENKINS, C. H. M., heating and cooling curves of steel, 373*A*.
JENKINS, G. C. H., heating and cooling curves of steel, 373*A*.
JENKINS, L. R. E., elected Member, 14*P*.
JENKINS, R., early ironfounding in England, 83*A*.
JENKS, G. F., tensile-impact tests, 110*A*.
JENNINGS, C. H., welding, 28*A*.
JEVONS, J. D.:
deep-drawing, 219*A*.
press work, 152*A*.
JOHNSON, G. H., blast-furnace refractories, 659*P*.
JOHNSON, H. V., probability tables, 211*A*.
JOHNSTON, R. W. welding of low-alloy steels, 165*A*.
JOLIVET, H., elected Member, 14*P*.

JOLLY, T :
American open-hearth practice, 486*P*.
rolling of sections, 338*P*.
soaking pits, 531*P*.
JONES, B., quench-ageing of steel, 519*P*.
JONES, D. J., elected Associate, 15*P*.
JONES, F. W. :
Paper : "Notes on Discontinuities in the Resistance-Temperature Curves of Commercially Pure Iron and Steel." *See* SYKES, C.
JONES, F. W., and C. SYKES :
Paper : "The Inverse-Rate Curves of Steel No. 10," 537*P*.
JONES, H. N. :
Paper : "A Study of Strain-Age-Hardening of Mild Steel." *See* EDWARDS, C. A.
JONES, J. A. :
quenching oils, 354*A*.
temper-brittleness in alloy steel, 102*A*.
JONES, J. I., oxidation of coal humic acids, 138*A*.
JONES, W. D. :
powder metallurgy, 304*A*.
powder metallurgy of iron, 119*A*.
JONES, W. R. D., bearing metals, 155*A*.
JOSEPH, T. L. :
blast-furnace practice, 337*A*.
desulphurisation of cast iron, 209*A*.
inclusions in cast iron, 189*A*.
reduction of iron ore by hydrogen, 207*A*.
JUNGBLUTH, H. :
cupola practice, 13*A*.
production of castings, 209*A*.
relation between coke consumption and flue-gas composition in cupolas, 269*A*.
JUNKES, J. :
determination of carbon in iron, 383*A*.
spectroscopically pure iron, 384*A*.
JURASCHEK, F. :
conveying equipment for steel mills, 279*A*.
metal cleaning, 289*A*.

KABAYASHI, T., elected Member, 14*P*.
KAIN, C. H., slow cooling of castings, 319*P*.
KAISER, K. B., power requirements of milling machine, 107*A*.
KALIŃSKI, A., effect of vanadium in steel, 306*A*.
KALLAUNER, O., elected Member, 14*P*.
KANZ, A., effect of burning temperature and grain size on porosity of refractory bricks, 78*A*.
KAPLAN, A., control of steel melting, 274*A*.
KARELINA, A., phosphorus-bearing steel, 194*A*.
KARSTEN, A., arc furnaces, 89*A*.
KARYAZIN, P., high-speed tungsten steel, 101*A*.
KARYAZIN, P. P., heat-treatment of steel, 25*A*.
KASTEN, G. W., iron-chromium-phosphorus system, 308*A*.
KAUCHTSCHISCHWILI, M., plant of Cogne Co., 16*A*.
KAUFFELD, T. J., lubrication of strip mills, 96*A*.
KAUFMANN, R. H., power supply for steel mills, 157*A*.
KAWAKAMI, Y., elected Member, 14*P*.
KAZARNOVSKIY, L. SH. :
iron-nickel alloys, 179*A*.
manganese-aluminium steel for high-frequency generators, 53*A*.
KEARNS, C. M., measurement of vibratory stresses, 112*A*.
KELLER, A., galvanising of wire, 170*A*.
KENNEDY, F., fuel control, 5*A*.
KENNEDY, L. E., oil and gas resources of Oklahoma, 76*A*.
KENNEY, E. F., axle plant of Bethlehem Steel Co., 218*A*.
KENT, B. B., preparation of sheet-iron enamels, 39*A*.
KERNAHAN, W. C., plant of J. H. Williams & Co., 92*A*.
KERR, S. L., determination of cavitation by vibratory methods, 247*A*.
KESSLER, F., effect of smelting low-grade ore on power supply, 337*A*.
KHIMUSHIN, F. F., effect of sulphur-bearing gases on heat-resistant steel, 195*A*.
KIDANI, Y., fatigue of metals, 111*A*.
KIESSLER, H., embrittlement of heat-resistant steel, 299*A*.
KILBEY, A. J., elected Member, 14*P*.
KING, F., Durville casting process, 312*P*.
KINKEAD, R. E., composite steel, 291*A*.

KINKUL'KIN, B., thermo-electric pyrometers, 280*A*.
KINNEY, J. S., effect of high temperatures on fatigue of alloy steel, 47*A*.
KIRCHER, A., coking of Ruhr coal, 8*A*.
KIRICHENKO, N. D., blast-furnace tuyeres, 265*A*.
KITAEV, B., effect of weight of charge on output of open-hearth furnaces, 273*A*.
KLÄRDING, J., reduction of iron ores with carbon, 10*A*.
KLAUSTING, E. Z., steel for aircraft engine valves, 184*A*.
KLEDITZ, D., sand-blasting of castings, 272*A*.
KLEEMAN, R. T., iron ore industry of South Australia, 75*A*.
KLINGER, P., analytical methods at Krupp's works, 248*A*.
KNAPP, B.:
diffusion of gases in metals, 180*A*.
reaction between hydrogen and carbon in iron, 189*A*, 306*A*.
KNIGHT, R., open-hearth plant of Australian Iron and Steel, Ltd., 87*A*.
KOCHENDÖRFER, A., plastic properties of crystal lattices, 41*A*.
KOEPPEL, C., by-product plant of Gutehoffnungshütte, 205*A*.
KÖHLER, A., magnification in microscopy, 187*A*.
KONTOROVICH, I. E., effect of grain size on austenite transformation in chromium-nickel steel, 62*A*.
KORB, F. B., forced convection furnaces, 354*A*.
KORNETZKI, M., relation between elastic modulus and damping of magnetic materials, 113*A*.
KORSCHAN, H., cupola practice, 13*A*.
KOSS, W., properties of plates at high temperatures, 366*A*.
KÖSTER, W., modulus of elasticity and damping, 120*A*.
KOSTING, P. R., surface cracks in chromium-nickel-steel castings, 61*A*.
KOSTRON, H., hardness tester, 295*A*.
KOWRAJSSKY, K., relation between inclusions and grain size of steel, 242*A*.
KOZLOWSKI, L.:
effect of titanium and molybdenum on magnetic properties of iron-nickel-aluminium alloys, 52*A*.
KOZLOWSKI, L. (*contd.*)—
iron-aluminium-nickel alloys for permanent magnets, 362*A*.
KRANER, H. M., manufacture of fused mullite, 1*A*.
KRATENKO, N., use of agglomerate in blast-furnaces, 82*A*.
KRAUS, C. E., tool-life/cutting speed relationship, 107*A*.
KREMER, G.:
effect of water on fuel consumption in sintering furnaces, 201*A*.
magnetic roasting of brown iron ore, 200*A*.
KRISCH, A.:
chromium-molybdenum steel, 369*A*.
determination of creep limit, 44*A*., 235*A*.
KRITZLER, G., flame hardening of cast iron, 159*A*.
KRIVOBOK, V. N:
permanency of stainless steel, 66*A*.
stainless steel, 343*A*.
KRUS, A., desulphurisation of pig iron in Stürzelberg furnace, 143*A*.
KRYNITSKY, A. I., elastic properties of cast iron, 359*A*.
KUCZEWSKI, W., recuperators for blast furnaces, 10*A*.
KULIŃSKI, ST., properties of corrosion- and heat-resistant steel at high temperatures, 365*A*.
KUNTZE, W., tests of materials, 294*A*.
KURAEV, V. V., properties of alloy steel, 55*A*.
KURODA, M., yield point of soft steel, 229*A*.
KUROKAWA, K., chromium-molybdenum steel, 117*A*.
KUZNETSOV, A. A., ageing of iron-aluminium-nickel alloys, 296*A*.
KUZNETSOV, V. V., stainless steel, 183*A*.

LABAN, N. R., bright nickel plating, 36*A*.
LAIZNER, H. VON, fatigue-testing machines, 175*A*.
LANES, F., elected Member, 14*P*.
LANGE, E., coal-tar pitch for carburetting gas, 140*A*.
LANGE, H., saturation points of cementite and carbon steels, 51*A*.
LANGEBECK, H. H., flame hardening, 27*A*.
LANGER, B. F., fatigue failure of machine parts, 112*A*.

LANSING, J. H., malleable cast iron, 237*A*.
LAPELLE, R. R., electric furnace design, 102*A*.
LAPTEV, N., defects in blooms and tubes, 21*A*.
LARKE, SIR WILLIAM, welding problems, 103*A*.
LARSEN, B. M., aspirating couple for gas temperatures, 98*A*.
LARSON, L. J., metallurgy of welding, 226*A*.
LATAPIE, M., signalling system for rolling mills, 158*A*.
LATTA, J. D., drop forging, 92*A*.
LAUDE, P. A., use of andalusite for furnace stoppers, 137*A*.
LAURE, Y., measurement of flame temperatures, 98*A*.
LAURENT, P., photo-elasticity, 231*A*.
LAWRENCE, F. C., metal spraying, 38*A*.
LAWRIE, R. D., loam moulding, 271*A*.
LAWRIE, W. B.:
Paper: "The Refining of Metal in the Basic Open-Hearth Furnace. The Influence of Fluorspar on the Process," 257*P*. *Discussion*, 281*P*. *Correspondence*, 282*P*. *Author's Reply*, 285*P*.
LEA, F. C., creep of metals, 46*A*.
LEADBEATER, C. J.:
electroplating of tinplate, 171*A*.
nickel and chromium plating of tinplate, 35*A*.
LEATHEROCK, O., oil and gas resources of Oklahoma, 76*A*.
LEBEDEV, P. S. effect of vacuum remelting on iron alloys, 53*A*.
LE COMTE, H., welding, 284*A*.
LEDWARD, T. A., magnetic properties of iron-nickel alloys, 233*A*.
LEE, A. P., casting of low-carbon iron, 271*A*.
LEE, Y. Y., coal in China, 317*A*.
LEGRAYE, M., mineral industry of Czechoslovakia, 199*A*.
LEITCH, R. D., corrosion of pipes in mine water, 309*A*.
LEMPERT, G., heat treatment of steel, 101*A*.
LEROYER, M., malleablisation of white cast iron, 210*A*.
LESTER, H. H.:
non-destructive tests, 120*A*.
radiography in industry, 59*A*.
LE THOMAS, A., cast iron for engine construction, 115*A*.
LEVENSON, L. H., structure of iron after drawing and swaging, 294*A*.
LEWIS, K. B., stresses in wire-drawing dies, 93*A*.
LEWIS, W. H., chilled and grain rolls, 210*A*.
LEWIS, W. R., history of canning industry, 70*A*.
LEYCHENKO, M. A., cold-rolling mills, 20*A*.
LICHTENWALTER, T. R., welding of stainless steels, 107*A*.
LIDSTONE, L. A., elected Associate, 15*P*.
LIEDHOLM, C. A., weldability of chromium-vanadium steel, 226*A*.
LINABURY, J. E., foundry of McKinnon Industries, Ltd., 340*A*.
LINDEN, K. V. D., reheating furnaces, 216*A*.
LINDERN, C. VON, jun., elected Member, 14*P*.
LINLEY, A., elected Member, 14*P*.
LIPILIN, I. P.:
austenite transformation in chromium-nickel steel, 192*A*.
austenite transformation in high-speed steel, 192*A*.
heat-treatment of ingots, 25*A*.
LIPPERT, T. W., flame scarfing, 21*A*.
LIPS, E., fluidity of molten metals, 15*A*.
LIVSHITS, B. G.:
effect of copper in nickel-aluminium steel, 179*A*.
magnet steel, 52*A*.
nickel-aluminium magnet steel, 112*A*.
LJUNGREN, B., awarded Carnegie Research Grant, 37*P*.
LLOYD, A. H., cutting fluids for machine tools, 31*A*.
LLOYD, D. H., elected Member, 14*P*.
LOBACHEVA, LE. D., solution rate of graphite in cast iron, 306*A*.
LOBLEY, A. G., electric-furnace practice, 503*P*.
LOGAN, K. H., corrosion of pipes in soil, 309*A*.
LOHR, J. M., thermal expansion of iron-nickel alloys, 179*A*.
LOHSE, U., recovery of iron from foundry waste, 13*A*.
LONG, A. J. M., elected Associate, 15*P*.
LONGENECKER, C.:
plant of Allegheny-Ludlum Steel Corp., 273*A*.

LONGENECKER, C. (*contd.*)—
plant of Carnegie-Illinois Steel Corporation, 16*A*.
LONGWELL, B., annealing of silicon-steel strip, 25*A*.
LONSDALE, T., oxide films on steel, 188*A*.
LOPATIN, A., rimming steel for boiler plates, 275*A*.
LORD, W. M., elected Member, 14*P*.
LORENZ, F. A., casting *versus* welding, 226*A*.
LÖW, E., corrosion of sheets in town gas, 309*A*.
LOWE, H., foundry practice, 270*A*.
LOWTHER, J. G.:
creep resistance of steel, 44*A*.
creep tests of carbon steel, 45*A*.
LUEG, W.:
diameter of round wire before rolling flat, 19*A*.
power requirements and flow of material in drop forging, 217*A*.
LUM, J. H., combustion of fuel, 331*A*.
LUNDEGARDH, H., spectrum analysis, 129*A*.
LUTZE, W. F., fits and tolerances, 288*A*.
LUYKEN, W.:
effect of water on fuel consumption in sintering furnaces, 201*A*.
magnetic roasting of brown iron ore, 200*A*.
LYNAM, T. R.:
chrome refractories, 320*A*.
chrome refractories for open-hearth furnaces, 136*A*.
LYUBCHANSKIY, S. M., effect of surface finish and design of rolls on steel strip, 20*A*.

MABB, P., electroplating, 290*A*.
MCALPINE, T., control of foundry operations, 13*A*.
MACARA, T., tinned foods of historical interest, 70*A*.
MCCANCE, A., determination of oxygen, 611*P*.
MCCARTHY, B. L., structure and properties of steel for wire-drawing, 242*A*.
MCCLELLAND, E. H., elected Member, 14*P*.
MCCLOUD, J. L., organic coatings, 66*A*.
MACDOUGALL, A. J.:
quench-ageing of steel, 518*P*.
segregation in steel, 345*A*.
MCELWEE, R. G., deoxidation and graphitisation of cast iron, 116*A*.
MCGARRITY, W. F., strip for deep-drawing, 92*A*.
MACGREGOR, C. W., plastic torsion, 110*A*.
MACHU, W.:
corrosion of iron, 127*A*.
prevention of acid corrosion by organic substances, 196*A*.
MCKENDRICK, A., steelworks refractories, 656*P*.
MACKENZIE, J. T.:
blast pressure in cupolas, 269*A*.
reactions in cupolas, 338*A*.
MCLACHLAN, J., elected Member, 14*P*.
MCMILLAN, W. D., short-cycle annealing of malleable iron, 270*A*.
MADDOCKS, W. R.:
A_3 point in iron-cobalt alloys, 374*A*.
determination of oxygen in steel, 378*A*.
MAGUIN, H., distribution of charge in blast-furnaces, 206*A*.
MAHIN, E. G., pearlite, troostite and sorbite, 58*A*.
MAIN, J. M., descaling plant of Republic Steel Corp., 289*A*.
MAIN, S. A.:
Durville casting process, 305*P*.
effect of high-frequency currents on steel, 555*P*.
quench-ageing of steel, 511*P*.
quenching, 563*P*.
temper hardening of steel, 283*A*.
MAKAGON, M. B., surface hardening, 282*A*.
MALAVAL, P., physics of metals, 370*A*.
MALINKINA, E. I., use of peat coke for carburisation, 159*A*.
MALISIUS, R., tensile-fatigue strength of welded joints, 228*A*.
MALLON, H. D., elected Associate, 15*P*.
MANION, C. H., terne plates, 351*A*.
MANTEL, W., determination of nitrogen in fuel, 129*A*.
MANTERFIELD, D., behaviour of sulphur in basic open-hearth process, 148*A*.
MANTIUS, O., disposal of pickling liquor, 34*A*.
MARGOLIN, YU., effect of cold-rolling and recrystallisation on magnetic properties of transformer steel, 51*A*.
MARGOLIN, YU. M., effect of elements on transformer steel, 114*A*.

MARIN, J.:
creep of structural members, 114*A*.
stresses in pipe flanges subjected to creep, 180*A*.
MARRS, G. O., iron-carbon diagram, 65*A*.
MARSHALL, C. T., changes in steel below 400°C., 359*A*.
MARSHALL, E. G.:
dies for forging, 218*A*.
forging practice, 151*A*.
MARTIN, G. T. O.:
control in vitreous enamelling, 38*A*.
vitreous enamelling, 172*A*., 293*A*.
MARTIN, L. C., Elektron microscope, 187*A*.
MASALOV, G. I., cold-drawn wire, 153*A*.
MASON, H. J., cutting fluids, 31*A*.
MASSINON, J., chemistry and petrography of coal seams, 80*A*.
MASUKO, T., nickel alloys in high-permeability machines, 298*A*.
MATHERS, F. C., silverplating of steel, 36*A*.
MATHIEU, K., saturation points of cementite and carbon steel, 51*A*.
MATHUR, P. N., direct production of iron, 267*A*.
MATTEOLI, L., elected Member, 14*P*.
MATTHEWS, S., measurement of gas temperatures, 98*A*.
MAURER, E., fatigue of tube steel, 176*A*.
MAWHINNEY, M. H., temperature uniformity in combustion chambers, 80*A*.
MAYERS, M. A., combustion rates in fuel beds, 80*A*.
MECKES, G. A., elected Member, 14*P*.
MEEHLEIB, H. S., elected Associate, 15*P*.
MEHL, R. F., recrystallisation in metals, 372*A*.
MEIGH, C. H., Durville casting process, 307*P*.
MERKLEN, J., impact tests of carbon steel, 173*A*.
MERTEN, W. J., large forgings, 92*A*.
MES'KIN, V.:
effect of cold-rolling and recrystallisation on magnetic properties of transformer steel, 51*A*.
magnetic properties of chromium steel, 234*A*.
MES'KIN, V. S.:
effect of elements on transformer steel, 114*A*.
MES'KIN, V. S. (*contd.*)—
effect of phosphorus and arsenic on dynamo and transformer steel, 181*A*.
ferro-magnetic alloys in Russia, 178*A*.
MESSERLE, K. V., blast furnace at Petrovskiy Works, 266*A*.
MEYER, F. W., elected Member, 14*P*.
MEYER, H., roller bearings, 278*A*.
MICHEL, J., heat-resistant metals for electric furnaces, 239*A*.
MICHELS, A., measurement of temperature in high-pressure containers, 98*A*.
MICKEL, E., tensile-fatigue strength of welded joints, 228*A*.
MIHARA, K., high-permeability alloys, 298*A*.
MIKALOFF, J. P., control instruments for blast furnaces, 142*A*.
MIKLÓSI, C., welding of rails, 227*A*.
MIKOLAJCZYK, J., density of metals under high pressure, 146*A*.
MILBOURN, M., spectrum analysis, 252*P*.
MILBURN, L. R., pickling of strip, 168*A*.
MILLER, J. L., spot and projection welding, 163*A*.
MILOVIDOV, N., lubrication of rolling mills, 278*A*.
MINKERVICH, N. A., properties of steel for ammonia plant, 235*A*.
MINKEVICH, N., effect of low temperatures on quenched steel, 63*A*.
MOCHALKIN, R. I., nitriding of chromium-vanadium steel, 225*A*.
MOCHEL, N. L.:
non-destructive tests, 120*A*.
relaxation tests of steel, 114*A*.
MÖLLER, H.:
fatigue testing and crystal structure, 47*A*., 295*A*.
X-ray examination, 187*A*.
MORGAN, G. T., oxidation of coal humic acids, 138*A*.
MORGAN, J. D., growth of cast iron, 236*A*.
MORGAN, J. D. D., elected Associate, 15*P*.
MORLEY, M. C., determination of sulphur dioxide in gases, 249*A*.
MOROZOV, B. A., effect of sulphur-bearing gases on scaling during heat treatment, 282*A*.
MORROGH, H.:
defects in cast iron, 242*A*.
metallography, 120*A*.

MORT, E. R., rolling of liquid metal, 222*A*.
MOSER, H., Tromp coal-cleaning process, 204*A*.
MOSHKEVICH, I., time-plan for open-hearth plant, 17*A*.
MOUSSON, J. M., cavitation of metals, 125*A*.
MUIR, D. C., elected Member, 14*P*.
MÜLLER, E., heat-balance of Héroult furnace, 212*A*.
MÜLLER, H. G.:
relation between precipitation processes and magnetic hardness of alloys, 113*A*.
segregation in iron-copper-nickel alloys, 243*A*.
MULLER, L.:
filtration of sludge from coal washeries, 332*A*.
settling tanks, 204*A*.
treatment of coal-washery water, 204*A*.
MÜLLER, R. W., corrosion of steel in wines, 245*A*.
MÜLLER, W. F., corrosion of sheets in town gas, 309*A*.
MÜNKER, T., power requirements and flow of material in drop forging, 217*A*.
MURPHY, D. W., austenite transformation in grey iron, 307*A*.
MURRAY, J. V., hot- and cold-working of malleable cast iron, 152*A*.
MURRAY, W.:
analysis of chlorine residues, 382*A*.
analysis of non-metallic residues from steel, 382*A*.
determination of inclusions, 380*A*.
MURRAY, W. E., gas cutting, 106*A*.
MUSGRAVE, J., chrome-ore mining at Selukwe, 75*A*.
MUSSMANN, H., rotation of crystals in magnetic field, 60*A*.
MYRTSYMOV, A. F., carbon electrodes, 90*A*.

NÁDAI, A., constant strain-rate tests on steel, 115*A*.
NAESER, G., measurement of flame temperatures, 98*A*.
NAUJOKS, W.:
forgings for aircraft construction, 347*A*.
metals for forging, 217*A*.
NAUMANN, F. K.:
effect of elements on hydrogen attack of steel, 126*A*., 196*A*.
effect of hydrogen on steel, 196*A*.
NAZAROVA, T. N., grain size in tool steel, 62*A*.
NEALEY, J. B.:
production of crankshafts, 24*A*.
wire-coiling machine, 94*A*.
NEEF DE SAINVAL, A., elected Member, 14*P*.
NELSON, H. W., combustion of fuel, 331*A*.
NELSON, W., hardening in salt baths, 224*A*.
NEUHAUS, C. J., spectrum analysis, 129*A*.
NEUMANN, G., temperature distribution in annealing furnaces, 354*A*.
NEUMEISTER, H., effect of arsenic in steel, 368*A*.
NEWALL, H. E., effect of inorganic compounds on combustion of coal, 5*A*., 203*A*.
NEWELL, W. C., determination of oxygen in steel, 379*A*.
NEWMAN, W. A. C., ingot moulds, 339*A*.
NICOLAU, P.:
roughness of steel surfaces, 376*A*.
tests of cast iron, 109*A*.
NIJHAWAN, B.R., elected Member, 14*P*.
NIPPER, H., fluidity of molten metals, 15*A*.
NISHINA, T., magnetic properties of alloys, 298*A*.
NOBLE, W.:
Paper: "The Influence of Carbonising Conditions on Coke Properties. *See* BLAYDEN, H. E.
NORTHCOTT, L.:
Paper: "The Application of the Durville Rotatory Process to the Casting of Steel," 297*P*. *Discussion*, 305*P*. *Correspondence*, 310*P*. *Author's Reply*, 313*P*.
effect of titanium in iron and steel, 367*A*.
segregation in steel, 609*P*.
NORTON, F. H., creep tests of tubular members, 45*A*.

O'DONNELL, H. J., preparation of thin coal sections, 6*A*.
OELSEN, W.:
desulphurisation of pig iron, 82*A*.
production of high-manganese slag, 207*A*.
OGÓREK, J., heat-treatment of deformation-resistant steel, 354*A*.

OLIVER, D. A., age-hardening, 515*P*.
OLIVER, F. J.:
cold-heading practice, 93*A*.
effect of cutting fluids on metal cutting, 31*A*.
heat-treatment furnaces, 24*A*.
presses, 218*A*.
presses and sheet-metal machinery, 92*A*.
pressing of sheet metals, 347*A*.
OLIVER, G. F., elected Member, 14*P*.
OLK, F., improvements in finishing iron and steel, 288*A*.
OLT, T. F., automobile sheets, 95*A*.
O'NEILL, H.:
effect of high-frequency currents on steel, 576*P*.
strain-ageing of steel, 426*P*.
transformations in alloy steel, 582*P*.
OSCARD, O., aluminium coatings on steel, 291*A*.
OSHCHEPKOV, V. D., carbon electrodes, 90*A*.
OSSWALD, E., determination of stresses in tensile test, 242*A*.
OSTAPENKO, A., chromium-tungsten-silicon and chromium-silicon steel, 57*A*.
OSTAPENKO, A. V.:
magnetic properties of chromium-cobalt-molybdenum steel, 113*A*.
magnetic properties of chromium-tungsten and chromium-molybdenum steel, 51*A*.

PALMER, W. P., power station of Carnegie-Illinois Steel Corp., 331*A*.
PANTELEEV, V., cleaning of blast-furnace gas, 81*A*.
PARKER, G., awarded Carnegie Research Grant, 37*P*.
PARKES, W. B., moulding sand, 338*A*.
PARKIN, M., measurement of gas temperatures, 98*A*.
PARRY, V. F., carbonising properties of coal, 334*A*.
PARTRIDGE, J. H., refractory materials, 202*A*.
PASCHKE, F., accidents in foundries, 272*A*.
PASCHKE, M., foundry iron from low-grade ore, 116*A*.
PATTERSON, W. S.:
effect of carbon on corrosion of steel, 194*A*.
PATTERSON, W. S. (*contd.*)—
effect of electrolytes on corrosion of zinc, aluminium and iron, 195*A*.
PAUL, H., coal separation plants, 7*A*.
PAVLOV, I. M., lubricants for cold-rolling, 156*A*.
PEARCE, J. G.:
control in vitreous enamelling, 38*A*.
vitreous enamelling, 172*A*., 293*A*.
PEARSON, R. W., determination of iron in presence of titanium, 248*A*.
PEARSON, V. G., electric welding in steel foundry, 163*A*.
PEELING, H. V., elected Member, 14*P*.
PENTEGOV, V., operation of open-hearth furnace ports, 147*A*.
PERCIVAL, R. T., segregation in steel, 345*A*.
PERSOZ, L., nitriding, 281*A*.
PETCH, N. J., effect of high-frequency currents on steel, 362*A*.
PETER, W.:
iron-niobium-carbon diagram, 65*A*., 243*A*.
iron-niobium diagram, 65*A*.
PETERS, F. P., propane for carburisation, 281*A*.
PETIT, D.:
hot-blast stoves, 206*A*.
refractory materials, 136*A*.
PETRENKO, B., recrystallisation of rail steel during hot working, 306*A*.
PETUNNIKOV, G., coal resources of Iraq, 76*A*.
PETZOLD, F., analysis of slags, 128*A*.
PFANNENSCHMIDT, C., foundry iron from low-grade ore, 116*A*.
PFANNENSCHMIDT, C. W., moulding sands, 84*A*.
PFEIL, L. B.:
scaling of steel, 551*P*.
strain-ageing of steel, 427*P*.
transformations in alloy steels, 374*A*.
PHRAGMEN, G., solidification of rimming steel ingots, 214*A*.
PIANTADINA, E., erosion of gun barrels, 69*A*.
PILARSKI, S., heat treatment of cast iron, 160*A*.
PIRANI, M., measurement of gas temperatures, 98*A*.
PIRKL, J., fatigue-testing machines, 175*A*.
PITTAWAY, C. H., elected Associate, 15*P*.

PIWOWARSKY, E.:
graphitisation of cast iron, 61*A*., 122*A*.
malleable cast iron, 144*A*.
pearlitic malleable cast iron, 63*A*.
POBORIL, F., effect of titanium in chromium steel, 142*P*.
PODTSCBENKO, E. A., manganese steel for boilers, 185*A*.
POHL, R., effect of annealing on steel, 161*A*.
POLLARD, R. E., protective value of paints, 196*A*.
POMEY, J., elected Member, 14*P*.
POMP, A.:
chromium-molybdenum steel, 369*A*.
determination of creep limit, 235*A*.
diameter of round wire before rolling flat, 19*A*.
power requirements and flow of material in drop forging, 217*A*.
spread of metal in rolling wire, 19*A*.
POPOFF, A., photo-elasticity, 231*A*.
POROSHKIN, D. A., cyaniding of steel, 281*A*.
PORTER, W. C., protective value of paints, 196*A*.
PORTEVIN, A.:
corrosion of steel by nitrates, 127*A*.
corrosion tests, 194*A*.
effect of nitrogen in steel, 137*P*.
structure of castings, 61*A*.
POSPELOV, D. Z., blast-furnaces at Zaporozhstal Works, 265*A*.
POTTER, A. A., oxidation of metals by steam, 127*A*.
POTTS, A. D., elected Member, 14*P*.
POUPET, L., burning of surplus blast-furnace gas, 206*A*.
POURBAIX, M., thermodynamics and corrosion, 193*A*.
POWELL, R. W.:
thermal conductivity and electrical conductivity of iron and steel, 364*A*.
thermal conductivity and electrical resistivity of steel, 363*A*.
PREECE, A., scaling of steel, 353*A*.
PRIDANTSEV, M. V.:
chromium-manganese-molybdenum and chromium-manganese-tungsten steels, 55*A*.
steel for aircraft-engine valves, 184*A*.
PRIESTLEY, W. J., vanadium iron and steel, 55*A*.
PROTHEROE, H. T., segregation in steel, 345*A*.
PRZEGALINSKI, S., elected Member, 14*P*.
PRZHEBLEVSKIY, K. A., drawing of high-speed steel wire, 94*A*.
PULLIN, V. E., radiography, 120*A*.
PÜNGEL, W.:
life of galvanised coatings, 170*A*.
strain-ageing of steel, 428*P*.
P'YANOV, G. P., chromium-vanadium spring steel, 94*A*.
PYE-SMITH, A. S., work of Ramage on spectrum analysis, 248*P*.

QUARRELL, A. G.:
effect of high-frequency currents on steel, 362*A*.
electron-diffraction study of oxide films, 371*A*.
elected Associate, 15*P*.
QUAST, B., wide-strip mills, 157*A*.

RABBITT, J. A., nickel alloys for permanent magnets, 298*A*.
RÄDEKER, W.
galvanising of steel, 170*A*.
life of galvanised coatings, 170*A*.
tests of clad steel plates, 35*A*.
RAINE, T., determination of oxygen in steel, 379*A*.
RAISTRICK, A., South Yorkshire iron industry, 83*A*.
RAKHSHTADT, A. G., magnet steel, 52*A*.
RAMESESHIAH, B., use of manganese ore in cupolas, 84*A*.
RAMU, C. S., elected Member, 14*P*.
RAO, D. V. KRISHNA, awarded Williams Prize, 13*P*.
RASTORGUEFF, A. A., control of steelmaking, 147*A*.
RAZOUS, P., manufacture of refractory bricks, 1*A*.
REES, W. J.:
Paper: "A Note on the Slow Cooling of Ingots," 315*P*. *Correspondence*, 319*P*. *Author's Reply*, 320*P*.
chrome-magnesite-dolomite mixtures, 321*A*.
chrome refractories, 320*A*.
chrome refractories for open-hearth furnaces, 136*A*.
moulding sands, 14*A*.
silica refractories for cupolas, 79*A*.
tridymitisation of silica bricks, 322*A*.
REEVE, L., determination of oxides in steel, 613*P*.
REIMER, G., roll impact in cold-rolling, 220*A*.

REIN, A., welded blast-furnaces, 336*A*.
REIN, C., accidents in foundries, 341*A*.
REINARTZ, L. F.:
Paper: "The Development of the Open-Hearth Steelmaking Processes in Recent Years in the United States of America." *Summary*, 479*P*. *Discussion*, 480*P*. *Correspondence*, 488*P*. *Author's Reply*, 490*P*.
REINARTZ, P. M., soaking pits, 531*P*.
RENAUD, F., heat-resistant nickel alloys, 302*A*.
RENGSHAUSEN, R., metal spraying, 171*A*.
RENTSCHLER, M. J., treatment of waste pickling liquor, 289*A*.
RENWICK, W. E., galvanised coatings, 291*A*.
REYNOLDS, D. A., carbonising properties of coal, 139*A*., 334*A*.
REYNOLDS, J. A., production of light castings, 145*A*.
RHONES, J. A., plastic torsion, 110*A*.
RIBAUD, G., measurement of flame temperatures, 98*A*.
RICE, H. B., spraying of zinc, 172*A*.
RICHARDSON, A. C., coal-washing plants, 7*A*.
RICHARDSON, G. T., scaling of steel, 353*A*.
RICHARDSON, H. M.:
action of alkalies on refractory materials, 326*A*., 327*A*.
jointing cements, 328*A*.
RICHARDSON, W. H., elected Associate, 15*P*.
RICKETT, R. L., decomposition of austenite at constant temperature, 63*A*.
RIDDELL, J. M., mining on Mesabi Range, 200*A*.
RIDDIHOUGH, M., decarburisation of steel, 24*A*.
RIEBECK, W., coal preparation, 332*A*.
RIGBY, G. R., thermal expansion of refractories, 2*A*.
RILEY, H. L.:
Paper: "The Influence of Carbonising Conditions on Coke Properties." *See* BLAYDEN, H. E.
coalification and carbonisation of coal, 333*A*.
RILEY, R. V., elected Associate, 15*P*.
RINGER, R. L., spot welding of steel, 104*A*.
RINKER, E. C., electrodeposition of cadmium, 290*A*.
RISTOW, A., drop-forging of steel and light metals, 152*A*.
RITCHIE, P. M., history of Wilsontown, 337*A*.
RITTS, A. V., galvanising of sheets, 169*A*.
ROARK, R. J., effect of form and scale on strength, 174*A*.
ROBBINS, F. J., lead-bearing steel, 107*A*.
ROBERTS, D. E., iron and steel manufacture, 12*A*.
ROBERTS, G., design of welded structures, 227*A*.
ROBIETTE, A. G.:
electric enamelling furnaces, 293*A*.
electric-furnace practice, 504*P*.
protective atmospheres in annealing furnaces, 161*A*.
ROBINSON, A., American open-hearth practice, 485*P*.
ROBINSON, E. L., relaxation tests of steel, 114*A*.
ROBINSON, L. P., core making, 145*P*.
ROBITSCHEK, J., insulation of open-hearth furnace roofs, 263*A*.
ROCHETTE DE LEMPDES, effect of oxy-acetylene cutting on steel, 105*A*.
ROCQUET, P., flux inclusions in tin coatings, 171*A*.
RODA, D. E., hardness variations in heat-treated parts, 232*A*.
RODGERS, J. W., A_3 point in iron-cobalt alloys, 374*A*.
RODGERS, J. W., and H. A. WAINWRIGHT:
Paper: "The Strain-Ageing of Dead-Mild Steel Strip used in the Pressing of Automobile Bodies and Accessories," 387*P*. *Discussion*, 419*P*. *Correspondence*, 428*P*. *Authors' Reply*, 429*P*.
RODGERS, O. E.:
effect of residual stress on welded seams, 166*A*.
internal stresses in butt-welded plate, 166*A*.
RODZEVICH, N. B., "Serp I Molot" Works, 147*A*.
ROEBUCK, A., engineering practice in steel industry, 87*A*.
ROGERS, W. F., corrosion of steel in soil, 69*A*.
ROHN, W., creep of metals, 299*A*.
ROLL, F.:
flame hardening of cast iron, 159*A*.
microscopic examination of metals, 241*A*.

ROLLASON, E. C., temperature measurement, 280*A*.
ROMWALTER, A., history of iron-making in Hungary, 208*A*.
ROONEY, T. E.:
determination of oxygen, 617*P*.
separation of oxides in steel, 381*A*.
ROSCISZEWSKI, A., elected Member, 14*P*.
ROSE, A., effect of cooling rate on vanadium steel, 64*A*.
ROSENBAUM, K., rolling-mill construction, 95*A*.
ROSS, W. F., annealing of cold-rolled strip, 354*A*.
ROSSUM, O. VAN, malleable cast iron, 144*A*.
ROWE, F. W.:
Randupson system of moulding, 339*A*.
elected Member, 14*P*.
ROZDYMAKHA, P., recrystallisation of rail steel during hot working, 306*A*.
RUBSTOV, A. YA., roll pressures, 95*A*.
RUECKEL, W. C., reaction of coal ash with coke-oven walls, 3*A*.
RUFF, W., awarded Carnegie Gold Medal, 12*P*.
RUNDLE, J. L., design of fuel-fired furnaces, 138*A*.
RUSSELL, G. A. V., American rolling-mill practice, 349*A*.
RUSSELL, R., jun., wear of metals in clay-working machines, 297*A*.
RUSSELL, T. F.:
Paper: "The Interpretation of Thermal Curves and Some Applications to Ferrous Alloys," 147*P*. *Correspondence*, 177*P*. *Author's Reply*, 185*P*.
quenching oils, 355*A*.
segregation in steel, 604*P*.
transformations in alloy steel, 564*P*.
RYLANDS, G. K., patenting of wire, 276*A*.

SACK, J., tensile strength of deposited weld metal, 104*A*.
SAEGER, C. M., jun., elastic properties of cast iron, 359*A*.
SAKAMOTO, T., nickel alloys for electrical instruments, 117*A*.
SALELLES, R.:
arc welding, 163*A*.
electric-resistance welding, 284*A*.
welding of rails, 29*A*.
SALMONY, A., alloy steels, 119*A*.
SAMARIN, A., gas content of steel during melting process, 148*A*.
SAMUELS, I., heat treatment of steel, 161*A*.
SANDELIN, R. W., relation of composition to quality of steel, 41*A*.
SANDERS, M. C., determination of oxygen in steel, 379*A*.
SANDERS, W. E., carburising furnace, 223*A*.
SANDERSON, L.:
alloy steels for colliery equipment, 301*A*.
heat-resistant steel, 117*A*.
size variation in die steels, 102*A*.
SANDS, G. A., heat treatment of stainless steel pressure vessels, 354*A*.
SANFORD, R. L., non-destructive tests, 120*A*.
SANSONE, R., Savona coking plant, 80*A*.
SARJANT, R. J.:
blast-furnace refractories, 662*P*.
scaling of steel, 554*P*., 568*P*.
steelworks refractories, 655*P*.
SAUNDERS, O. A., measurement of gas temperatures, 98*A*.
SAUVEUR, A., micro-constituents of steel, 187*A*.
SAXTON, R., cold-working of steel, 26*A*.
SCARPA, O., elected Member, 14*P*.
SCHACK, A., suction pyrometers, 98*A*.
SCHÄFER, O., Tromp coal-cleaning process, 139*A*., 204*A*.
SCHAFMEISTER, P.:
iron-chromium-nickel diagram, 307*A*.
soldering and brazing of alloy steel, 227*A*.
SCHALLBROCH, H., machinability of steel, 288*A*.
SCHAUMANN, H., machinability of steel, 288*A*.
SCHEIBLICH, O., deoxidation of basic Bessemer steel, 88*A*.
SCHERER, G. F., alloy-steel valves, 185*A*.
SCHERER, R., embrittlement of heat-resistant steel, 299*A*.
SCHIEBOLD, E., X-ray measurement of stress, 241*A*.
SCHIEDT, E., X-ray measurement of stress, 110*A*.
SCHLECHTWEG, H.:
orientation of crystals, 60*A*.
SCHLITT, F. F., galvanising, 37*A*.

Schlötter, M., metallic coatings, 290*A*.
Schmidt, E., elected Member, 14*P*.
Schmitz, H., coal and iron ore in United States, 200*A*.
Schofield, F. H., "quick-immersion" thermocouple, 352*A*.
Schottky, H., soldering and brazing of alloy steel, 227*A*.
Schrader, A.:
graphitisation of cast iron, 122*A*.
structure and tensile strength of cast iron, 116*A*.
Schrader, H., effect of aluminium in steel, 300*A*.
Schreiber, W., determination of nitrogen in fuel, 129*A*.
Schuch, J. A., moulding sands for steel castings, 84*A*.
Schuh, A. E., adherence of coatings to metals, 35*A*.
Schüle, G., casting of vacuum cylinder, 146*A*.
Schulz, E. H.:
steel structures, 304*A*.
strain-ageing of steel, 428*P*.
welding of high-tensile steel, 285*A*.
Schulze, A.:
amorphous state of metals, 189*A*.
metallic materials for thermocouples, 98*A*.
Schulze-Manitius, H., electroplating, 169*A*.
Schumacher, G. A., malleable cast iron, 14*A*.
Schuster, L. W., relation between properties and results in service, 237*A*.
Schüter, W., iron-silicon-titanium system, 65*A*.
Schwarz, M. von, wear resistance of cast iron, 177*A*.
Schwedler, U., bright annealing, 22*A*.
Scott, F. W.:
desulphurisation of cast iron, 209*A*.
inclusions in cast iron, 189*A*.
Seabloom, E. R., bi-metal construction of steel valves, 164*A*.
Seager, G. C., repeated-impact tests, 174*A*.
Searle A. B., dolomite bricks, 1*A*.
Seelig, R. P., fatigue of metals, 176*A*.
Seeman, A. K., surface hardening, 224*A*.
Seemann, H. E., radiography of aluminium, steel and lead, 305*A*.
Séférian, D., bubbling in welding, 285*A*.
Segan, L., removal of combustion products from open-hearth furnaces, 88*A*.
Sellisskiy, Ya. P., chromium ball-bearing steel, 121*A*.
Selvig, W. A.:
carbonising properties of coal, 139*A*, 334*A*.
sampling and analysis of coal, 129*A*.
Semikin, I., removal of combustion products from open-hearth furnaces, 88*A*.
Sergievskaya, T. V., heat treatment of spring steel, 160*A*.
Sháh, I. A., elected Member, 14*P*.
Shamrov, V. I., control of steel-melting, 149*A*.
Shanks, T., alloy cast iron, 236*A*.
Shapiro, B. S., rolling of strip from tungsten magnet steel, 20*A*.
Shapiro, C. L., hairlines in steel, 150*A*.
Sharp, R., pig iron manufacture, 11*A*.
Sharratt, R. E., elected Member, 14*P*.
Shaw, A., power presses, 348*A*.
Shchetkina, A. N., properties of Chromal, 43*A*.
Shchurin, P. M., use of peat coke for carburisation, 159*A*.
Sheehan, W. M., locomotive castings, 13*A*.
Sheppard, J., flame hardening, 100*A*.
Sherman, W. F., surface-finishing machinery, 32*A*.
Sherratt, G. G., coefficient of expansion of steel, 363*A*.
Sheynin, B., ingot moulds, 91*A*.
Sheynin, B. E., chromium-manganese steel, 183*A*.
Shipp, H. L., tinned foods of historical interest, 70*A*.
Shirakawa, Y., magneto-resistance effect in iron-silicon alloys, 362*A*.
Shklyar, T., liquid slag operation of soaking pits, 18*A*.
Shneerov, Ya, rimming steel for boiler plates, 275*A*.
Shtraus, N., wear of blast-furnace linings, 79*A*.
Shtuchkov, Ya. B., effect of grain size on carbon steel, 185*A*.
Shul'te, Yu., use of chromium-nickel and chromium-molybdenum scrap in arc furnaces, 17*A*.

SHVETSOV, V. N., defects in rolled steel, 150*A*.
SIDDALL, G., aspirating thermocouple for gas temperatures, 98*A*.
SIEBEL, E., tests of materials, 294*A*.
SIEGEL, H., structure of stainless steel, 123*A*.
SIMISTER, E., scaling of steel, 353*A*.
SIMON, W. H., testing of arc-welded joints, 103*A*.
SINEBRYUKHOV, N., air cooling in rolling-mill shops, 158*A*.
SINGER, F., insulation of open-hearth furnace roofs, 263*A*.
SKAPSKI, A., elected Member, 14*P*.
SKELTON, J. C., elected Member, 14*P*.
SKORIKOV, T. S., transformation of austenite, 64*A*.
SKOTNIKOV, V. V., grain size in tool steel, 62*A*.
SLATER, J. H., blast furnace of Republic Steel Corp., 265*A*.
SLOMAN, H. A., determination of oxygen, nitrogen and hydrogen in steel, 378*A*.
SMALLMAN-TEW, R.:
tests of welds, 165*A*.
welding of high-tensile steel, 357*A*.
SMALLWOOD, J. W., elected Member, 14*P*.
SMIRNOV, A. V., controlled atmospheres in heat-treatment furnaces, 100*A*.
SMITH, D. M., spectrum analysis, 249*A*.
SMITH, E. K., chromium cast iron, 183*A*.
SMITH, E. W. P., elastic models for studying stresses in welded joints, 166*A*.
SMITH, G. L., pressing of automobile sheets, 152*A*., 347*A*.
SMITH, H., elected Associate, 15*P*.
SMITH, J. L., jun., defects in iron castings, 86*A*.
SMITH, L. P., cavitation of propellers, 126*A*.
SMITH, R. P., American open-hearth practice, 480*P*., 488*P*.
SMITH, S. W. J., Widmanstätten structure of meteoric iron, 372*A*.
SMITH, W. H., drying of cores, 145*A*.
SMOLYANITSKIY, A., treatment of pig iron with flue dust, 10*A*.
SMOLYANITSKIY, YA., treatment of pig iron with flue dust, 10*A*.
SNOW, A., total heat of steel up to 950° C., 363*A*.
SOBOLEVSKIY, N., edging rolls for blooming mills, 221*A*.
SÖHNCHEN, E., malleable cast iron, 144*A*.
SOLBERG, H. L., oxidation of metals by steam, 127*A*.
SOLBORG, R. A., elected Member, 14*P*.
SOMEREN, E. VAN, spectrum analysis, 251*P*.
SOMIN, B., magnetic properties of chromium steel, 234*A*.
SPANGLER, S. F., recovery of waste pickling liquor, 34*A*.
SPÄTH, W., notch effect in static tensile tests, 109*A*.
SPEARS, R., bright zinc plating, 170*A*.
SPEIGHT, G. E.:
oxygen content of iron and steel, 383*A*.
separation of oxides and gases in steel, 378*A*.
SPELLACY, J. F., coiling of strip, 279*A*.
SPELLER, F. N., pretreatment of metal surfaces for painting, 33*A*.
SPENCER, W. H., wear resistance, 177*A*.
SPERANSKIY, V. G.:
electric-furnace practice, 213*A*.
Zaporozhstal' works, 212*A*.
SPOONER, E. G., elected Member, 15*P*.
SPRAGAGEN, W.:
corrosion-resistance of welded steel, 287*A*.
effect of sulphur on welding of steel, 358*A*.
impact tests of welded joints, 42*A*.
welding of coated steel, 357*A*.
welding of molybdenum steel, 165*A*.
welding of silicon steel, 28*A*.
SPRINGER, R., galvanising practice, 170*A*.
SPRUNK, G. C.:
carbonising properties of coal, 139*A*., 334*A*.
hydrogenation of coal, 335*A*.
preparation of thin coal sections, 6*A*.
STÄBLEIN, F., orientation of crystals, 60*A*.
STÄGER, H., corrosion of metals, 193*A*.
STANFIELD, G.:
quench-ageing of steel, 513*P*.
quenching, 561*P*.
quenching tests, 355*A*.
thermal analysis of steel, 556*P*.
STARKWEATHER, E. R., effect of titanium and silicon in cast iron, 115*A*.

STASSINET, T., reheating furnaces, 216*A*.
STEGENTA, B., primary austenite grains in steel, 372*A*.
STEIN, A., blast-furnace refractories, 661*P*.
STEUR, J., assembly of parts for welding, 29*A*.
STEVENSON, W. W.:
analysis of non-metallic residues, 382*A*.
oxygen content of iron and steel, 383*A*.
quenching oils, 354*A*.
separation of oxides and gases in steel, 378*A*.
X-ray examination of non-metallic residues, 383*A*.
STIELER, C.:
comparative properties of welds and castings, 28*A*.
cracking of welded seams, 286*A*.
welding of cast iron, 357*A*.
STOECKER, J., welded blast-furnaces, 336*A*.
STORCH, H. H., hydrogenation of coal, 335*A*.
STOSE, G. W., mineral resources of Pennsylvania, 76*A*.
STOTZ, N. I., die steels, 219*A*.
STRADLING, R. E., deterioration of reinforced concrete in sea-water, 67*A*.
STRECKER, W. W., strength of welded joints, 166*A*.
STRINGFELLOW, H. A., wire drawing, 276*A*.
STROHAUER, R., bearings, 156*A*.
STRYRI, H.:
Paper: "Slag Inclusions and Acid Open-Hearth Refining of High-Carbon Steel," 287*P*.
STUART, A. H.:
corrosion-resistance of zinc coatings, 292*A*.
painting of cold-pressed sheets, 39*A*.
protective paints, 172*A*.
SUN, C. C., iron ore in China, 199*A*.
SUPRUN, K., sintering of manganese tailings, 200*A*.
SUTCLIFFE, J. P., elected Associate, 15*P*.
SWALLOW, J. C., measurement of gas temperatures, 98*A*.
SWAN, J. C., spectrum analysis, 250*P*.
SWIFT, H. W., cutting fluids, 31*A*.
SWINDEN, T.:
acid-Bessemer process, 342*A*.
electric-furnace practice, 496*P*.
SWINDEN, T. (*contd.*)—
refractories, for steelworks, 318*A*.
refractory materials, 653*P*.
separation of oxides and gases in steel, 378*A*.
strain-ageing of steel, 419*P*.
SYKES, C.:
Paper: "The Inverse-Rate Curves of Steel No. 10." *See* JONES, F. W.
specific heat of steel, 557*P*.
SYKES, C., and F. W. JONES:
Paper: "Notes on Discontinuities in the Resistance-Temperature Curves of Commercially Pure Iron and Steel," 435*P*.
SZENDEROWSKI, L., heat treatment of cast iron, 160*A*.

TAIT, W. H., repeated-impact tests, 174*A*.
TAORMINA, S. C., control of electro-plating processes, 35*A*.
TARASOV, L. P., magetic properties of iron-silicon alloys, 233*A*.
TATESON, G., determination of oxygen in steel, 378*A*.
TATNALL, R. R., resilience of springs, 49*A*.
TAYLOR, J., elected Member, 15*P*.
TAYLOR-AUSTIN, E.:
determination of inclusions, 380*A*.
determination of oxygen, 619*P*.
separation of inclusions in pig iron and cast iron, 381*A*.
TENENBAUM, M.:
desulphurisation of cast iron, 209*A*.
reduction of iron ore by hydrogen, 207*A*.
TERRA, A., coal washing, 80*A*.
TESLER, YA. V., chromium-vanadium spring steel, 94*A*.
THAU, A., low-temperature distillation of coal, 139*A*.
THEISINGER, W. G., stress-relief in welds, 29*A*.
THÉVENIN, G., blast-furnace practice, 82*A*.
THIERRY, P., pig iron for basic Bessemer process, 207*A*.
THIESSEN, R.:
carbonising properties of coal, 139*A*., 234*A*.
preparation of thin coal sections, 6*A*.
THOMAS, B.:
refractory materials, 663*P*, 4*A*.
work of Alloy Steels Research Committee, 567*P*.

THOMAS, C. W., refractory materials, 654*P*.
THOMPSON, F. C.:
changes in steel below 400° C., 359*A*.
thermal properties of steel, 558*P*.
wire-drawing, 93*A*.
THORBURN, J. S., rolling of sections, 337*P*.
THORNHILL, R. S., priming paints without oil vehicles, 245*A*.
THORPE, P. L., frettage corrosion, 377*A*.
THRING, M. W., measurement of producer-gas temperature, 98*A*.
THUM, A.:
bend-fatigue strength of welds, 167*A*.
formation of fractures, 231*A*.
material in relation to design calculations, 294*A*.
THUM, E. E., welded freight cars, 227*A*.
TIGERSCHIÖLD, K. M., pyrometry, 624*P*.
TIMMONS, G. A., high-duty cast iron, 237*A*.
TITLESTAD, N., recovery of waste pickling liquor, 34*A*.
TIWARY, M. P., elected Member, 15*P*.
TODD, W.:
metallic abrasives, 168*A*.
use of metallic abrasives for cleaning castings, 39*A*.
TODD, W. J., pyrometry, 625*P*.
TOFAUTE, W., iron-titanium-carbon alloys, 244*A*.
TOMLINSON, G. A., frettage corrosion, 377*A*.
TOPERVERKH, N., temperature measurement of cast iron and steel, 98*A*.
TORRONTEGUI É IBARRA, L. J. de, elected Member, 15*P*.
TOUCEDA, E., malleable cast iron, 237*A*.
TOUR, S., impact testing, 230*A*.
TOWNEND, D. T. A., scaling of steel, 553*P*.
TRÄGÅRDH, K. F., corrosion prevention of steel pylons, 246*A*.
TRAILL, J. G., inspection and testing of winding ropes, 186*A*.
TREMBLAY, R. J., elected Associate, 15*P*.
TREMLETT, H. F., elected Associate, 15*P*.
TRINKS, W.:
radiation from non-luminous flames, 332*A*.
temperature distribution in solid bodies, 99*A*.
TROFIMCHUK, V., rolling-mill rolls, 277*A*.
TRUBENKOV, V. S., use of andalusite for furnace stoppers, 137*A*.
TRUOG, E., determination of iron in presence of titanium, 248*A*.
TSAREGORODTSEV, V. S., cyaniding of steel, 281*A*.
TSYLEV, L., effect of calcium sulphide on viscosity and melting point of slag, 267*A*.
TUCKER, R. C., quench-ageing of steel, 515*P*.
TUITE-DALTON, J. I., elected Associate, 15*P*.
TULYAKOV, A. P., low-temperature brittleness of metals, 300*A*.
TUPHOLME, C. H. S., flame cutting of composite steel, 30*A*.
TURSUNOV, A. V., effect of sulphur-bearing gases on scaling during heat treatment, 282*A*.
TWYMAN, F., spectrum analysis, 249*P*.
TYRIE, T., tests of moulding sand, 145*A*.

UFER, W., behaviour of sulphuric acid in pickling of strip, 33*A*.
ULRICH, F., swelling pressure of coal, 264*A*.
UNCKEL, H., effect of reduction, direction of rolling, and roll diameter on materials, 155*A*.
UNDERWOOD, A. J. V., oil from coal, 9*A*.
UPHAM, E. W., elected Member, 15*P*.
USOV, A., austenite transformation in high-speed steel, 192*A*.

VALLOT, E., impact tests of iron and steel, 173*A*.
VAYNSHTEYN, G. M., ferro-silico-zirconium, 267*A*.
VDOVIN, F., heat treatment of chromium-molybdenum steel tubes, 160*A*.
VERNON, W. H. J., determination of oxygen in oxide films, 631*P*.
VERŐ, J. A.:
etching of heat-resistant steel, 241*A*.
structure of cast steel, 191*A*.
VIÉ, G., coal deposits of La Vendée, 76*A*.
VIELHABER, L., enamelling of steel and cast iron, 293*A*.

VILELLA, J. R., troostite and sorbite, 58*A*.
VINOGRAD, M. I., heat treatment of cold-drawn alloy steel, 101*A*.
VLADIMIROV, L. :
open-hearth process, 88*A*.
properties of axles, 303*A*.
VLADISLAVLOV, V. S., hardening properties and grain size of tool steel, 49*A*.
VOGEL, R. :
iron-chromium-phosphorus system, 308*A*.
iron/iron - sulphide/vanadium-sulphide/vanadium system, 124*A*.
iron/nickel/nickel - titanide/iron-titanide system, 192*A*.
iron-niobium diagram, 65*A*.
iron-silicon-titanium system, 65*A*.
VOLK, C., Wöhler diagram, 110*A*.
VOLKENSHTEYN, N., effect of elements on magnetic properties of iron - nickel - aluminium alloys, 178*A*.
VOM BAUR, C. H., power consumption of electric furnaces, 90*A*.
VRATSKIY, M. recrystallisation of rail steel during hot working, 306*A*.
VYAZNIKOV, N. F., effect of titanium and beryllium in chromium-nickel steel, 303*A*.

WADE, W. H., electrodeposition of chromium, 36*A*.
WAHL, A. M., effect of wire curvature on stresses in springs, 295*A*.
WAINWRIGHT, H. A. :
Paper : "The Strain-Ageing of Dead-Mild Steel Strip used in the Pressing of Automobile Bodies and Accessories." *See* RODGERS, J. W.
WALDMAN, E. H., temperature measurement of liquid steel, 280*A*.
WALKER, W. S., welding and cutting of steel, 357*A*.
WALLACE, R. M., welding of pressure vessels, 226*A*.
WALLBAUM, H. J., iron/nickel/nickel-titanide/iron-titanide system, 192*A*.
WALLICHS, R., machinability of steel, 288*A*.
WALLQUIST, G., rolling-mill practice, 220*A*.
WALTERS, B. :
Paper : "A Study of Strain Age-Hardening of Mild Steel." *See* EDWARDS, C. A.
elected Member, 15*P*.
WALZEL, R., iron industry of Ostmark, 76*A*.
WANG, C. C., coal in China, 317*A*.
WARLOW, J. H., elected Member, 15*P*.
WASMUHT, R., effect of normalising on weldability of structural steel, 285*A*.
WATERFALL, F. D., hardening in salt baths, 224*A*.
WATTS, O. P., corrosion of metals, 193*A*.
WEAN, R. J., galvanising of sheets, 38*A*.
WEBB, C. E., magnetic materials, 50*A*.
WEBBER, A. F. :
errors in gas temperature measurement, 98*A*.
steam engineering, 474*P*.
WEBBER, H. M., electric-furnace brazing, 165*A*.
WEBER, R. H., carburising practice, 100*A*.
WEDDELL, R. R., tool-life/cutting speed relationship, 107*A*.
WEEDFALL, C. W., straightening equipment for malleable castings, 270*A*.
WEISBECK, F. P., arc welding in drop-forging industry, 357*A*.
WELTER, G. :
density of metals under high pressure, 146*A*.
tests of cast and rolled materials, 173*A*.
yield point of mild steel, 41*A*.
WERNER, O., ferrite spots in steel, 242*A*.
WERNICK, S., electroplating, 169*A*.
WESCOTT, B. B., fatigue and corrosion-fatigue of steel, 111*A*.
WESEMANN, F., smelting of low-grade ores, 82*A*.
WEST, A. C., use of nickel sulphate in electroplating, 36*A*.
WEST, W., wear of cast iron and malleable iron, 232*A*.
WEVER, F. :
effect of cooling rate on vanadium steel, 64*A*.
fatigue testing and crystal structure, 295*A*.

WHITAKER, H.:
sand-blasting of castings, 340*A*.
sand-blasting in enamelling industry, 39*A*.
WHITE, A. E., acceptability tests of steel for high temperature characteristics, 53*A*.
WHITE, H. E., refractory materials, 136*A*.
WHITE, J.:
high temperature equilibrium of iron-oxide systems, 190*A*.
awarded Carnegie Gold Medal, 12*P*.
WHITEHOUSE, F., moulding practice, 84*A*.
WHITELEY, J. H.:
inclusions in bath samples, 620*P*.
quench-ageing of steel, 520*P*.
scaling of steel, 572*P*.
strain-ageing of steel, 422*P*.
WHITTEN, J. L., temperature-measuring instruments for rolling mills, 158*A*.
WIEGAND, H., effect of notches on fatigue strength, 295*A*.
WIELKIE, H., recuperators for blast furnaces, 10*A*.
WILHELMI, A., smelting of low-grade ore, 142*A*.
WILK, J., tests of quenching media, 356*A*.
WILKINS, E. T., coal preparation, 332*A*.
WILKINSON, J. H., effect of electrolytes on corrosion of zinc, aluminium and iron, 195*A*.
WILKINSON, T. B., thermal disturbances during welding, 104*A*.
WILKINSON, W. D., welding of corrosion-resistant steel, 28*A*.
WILLIAMS, C. H., soaking pits and reheating furnaces, 532*P*.
WILLIAMS, E. A., elected Member, 15*P*.
WILLIAMS, G.:
wear of cylinders, 112*A*.
elected Member, 15*P*.
WILLIAMS, J. H., high-duty cast iron, 338*A*.
WILLIAMS, P., soaking pits, 530*P*.
WILLIAMS, R. S., developments in alloy steels, 238*A*.
WILLIAMS, R. Z., effect of form and scale on strength, 174*A*.
WILLIAMS, S. R., hardness testing, 177*A*.
WILLNERS, H., Spigerverk furnace, 268*A*.
WILLOCK, R. R., elected Associate, 15*P*.
WILLS, H. J., grinding of rolls, 349*A*.
WILLSEA, J., effect of moisture on strength of cores, 145*A*, 271*A*.
WILSON, C. M., bi-metallic wire, 153*A*.
WILSON, G. S., tinned foods of historical interest, 70*A*.
WILSON, J. F., steam engineering, 475*P*.
WILSON, W. T.:
Paper: "The Rolling of Sections at the Appleby-Frodingham Steel Co., Ltd.," 321 *P*. *Discussion*, 337*P*. *Correspondence*, 337*P*. *Author's Reply*, 339*P*.
WINTERBOTTOM, A. B.:
corrosion-fatigue, 579*P*.
determination of oxygen in oxide films, 630*P*.
ingot moulds, 638*P*.
optical studies of oxide films, 574*P*.
WINTERHOFF, F., wide strip mill in Germany, 96*A*.
WINTERTON, H., foundry facings, 85*A*.
WIRSHING, R. J., pretreatment of metals, 66*A*.
WOJTASZAK, I. A., stresses in welded pipes, 105*A*.
WOLF, F. L., galvanised coatings, 291*A*.
WOLFE, K. J. B., elected Associate, 15*P*.
WOOD, C. E., induction furnaces for rotating crucibles, 149*A*.
WOOD, H. C., charging of open-hearth furnaces, 487*P*.
WOOD, W. P., austenite transformation in grey iron, 307*A*.
WOODHOUSE, W., blast-furnace linings, 323*A*.
WOODLIFF, E. E., moulding sands for steel castings, 84*A*.
WOOLMAN, H. A., normalising furnaces, 162*A*.
WOOLMAN, J., age-hardening of steel, 510*P*.
WORMWELL, F.:
corrosion of metals in salt solutions and natural waters, 125*A*.
determination of oxygen in oxide films, 631*P*.
WRAIGHT, E. A.:
alloy steels, 301*A*.
fissures in rails, 175*A*.
WRETBLAD, P. E., powder metallurgy, 304*A*.
WRIGHT, E. C., failure of refinery tubes, 174*A*., 231*A*.
WRIGHT, H. V., elected Member, 15*P*.

WRIGHT, J. T., ingot moulds, 639*P*.
WUCHERER, J., benzole separation from coke-oven gas, 9*A*.
WULFF, J., transformation in stainless steel induced by polishing, 305*A*.
WÜSTERFELD, A., iron/iron-sulphide/vanadium-sulphide/vanadium system, 124*A*.
WYMAN, L. L.:
plastics for mounting specimens, 59*A*.
transformations in iron-cobalt-nickel alloys, 243*A*.
WYNTER, H. S., elected Member, 15*P*.

YAMAGISHI, I., fracture of cast iron, 109*A*.
YAMANOUTI, H., dies for metal drawing, 93*A*.
YAMASHITA, H., nickel alloys for generators, motors and transformers, 118*A*.
YASINES, S. F., tests of alloy steel welds, 42*A*.
YNTEMA, L. F., electrodeposition of chromium, 36*A*.
YOUNG, H. J.:
high-duty cast iron, 209*A*.
loded cast iron, 182*A*.
YOUNG, J., Widmanstätten structure of meteoric iron, 372*A*.
YOUNG, J. L., wide strip mills, 157*A*.
YOUNG, S. S., crater formation in arc welding, 103*A*.
YUZEFOVICH, R. YA., manufacture of tool steel, 118*A*.

ZAKLADNYY, M., oil quenching media, 27*A*.
ZAMORAEV, V. M., control of steel-melting, 274*A*.
ZANKO, A., determination of copper, 128*A*.
ZAVARINE, I. N.:
developments in alloy steels, 238*A*.
transformations in nickel steel, 307*A*.
ZAYMOVSKIY, A., effect of elements on magnetic properties of iron-nickel-aluminium alloys, 178*A*.
ZAYMOVSKIY, A. S.:
iron-nickel alloys, 179*A*.
magnetic properties of alloys, 112*A*.
manganese-aluminium steel for high-frequency generators, 53*A*.
ZEA, Y. K., elected Member, 15*P*.
ZELICHENOK, YU., time-plan for open-hearth plant, 17*A*.
ZEYEN, K. L., welding electrodes, 164*A*.
ZHAROV, G. I., effect of sulphur-bearing gases on heat-resistant steel, 195*A*.
ZHEREBIN, B., use of agglomerate in blast-furnaces, 82*A*.
ZHITNIKOV, D. G., chromium-silicon-vanadium steel, 118*A*.
ZORN, lubricating oils, 141*A*.
ZSCHOKKE, H., creep of metals, 298*A*.